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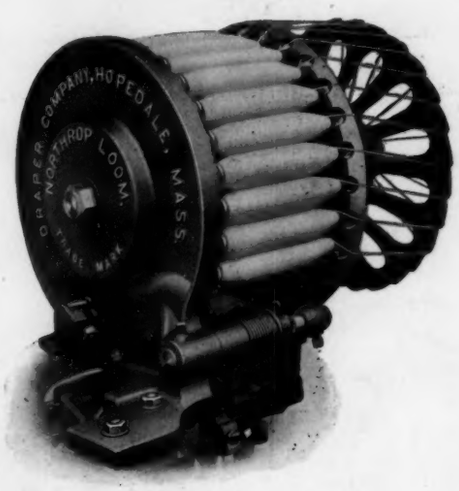

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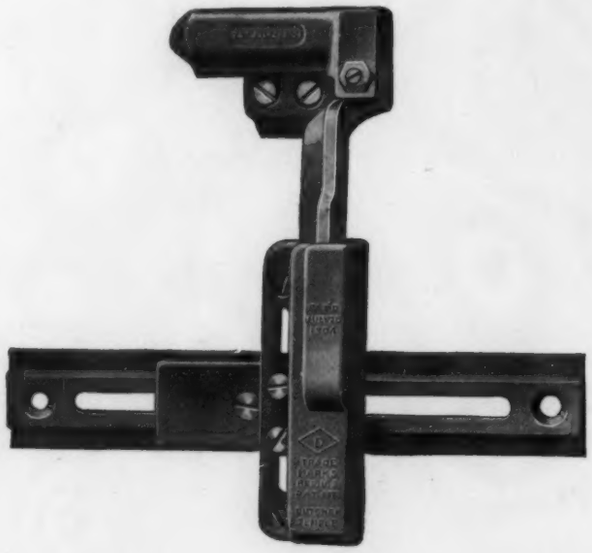

DUTCHER TEMPLES

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DRAPER COMPANY

SOLE MANUFACTURERS

HOPEDALE MASS.

COTTON

Published Monthly

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F. C. MYERS,
D. H. BRAYMER,
} **Associate Editors.**

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WORKING INDIAN COTTONS.

Lewis W. Parker, in an interview with COTTON's correspondent, which was published in the November, 1913 issue, indicated that to his mind the greatest danger of the extreme tariff reductions was going to be in connection with the manufacture of coarse yarns, Nos. 1's to 20's, which are largely made in the South. "The duties on these yarns have been reduced to 5 to 7½ per cent," said Mr. Parker. "These yarns can be made abroad on mule spindles from India cotton, and largely from waste. The foreign manufacturer, through the use of mule spindles, which are not used in America, can utilize waste and short staple cotton to a degree that is impossible to the American manufacturer. The Indian cotton and coarse waste is much lower in price than American cotton, and with the small duty prevailing, I expect to see these yarns imported in a great degree to the serious injury of the yarn mills of the South, particularly of North Carolina, Georgia and Alabama. There are very few yarn mills in South Carolina, and the mills of South Carolina will feel the effect only indirectly."

Because of these conditions, the following extracts from an article on Indian cottons in a recent issue of the Bolton, England, *Cotton Factory Times* will be of especial interest:

Indian cotton occupies an exceedingly important position in the world's supply of cotton since India ranks as the second largest cotton producing country of the world. While Egypt scarcely ever attempts to market short staple, coarse cotton, India on the other hand seldom attempts to market any but cottons of very moderate quality. Unlike Egypt, however, India is itself concerned a very great deal in spinning and weaving cotton, as well as in growing it, and a large proportion of the Indian cotton crop is annually made into yarn and cloth in the mills of that country.

Apparently, the coarse, cheap goods that can be produced from Indian cotton, suit the needs of the inhabitants of that country, and any raw cotton that India can spare usually finds a ready enough market in Japan, China, or in European countries. It is well understood that Indian cottons as a class are the worst that are cultivated to a very large extent, but they fill a definite position, and there are multitudes of purposes for which goods manufactured from Indian cotton may be appropriately used. There are very many people in the world who are forced to purchase cheap goods and manage to get along very well therewith. There are also very many purposes for which only poor kinds of cloth are needed, and to use cloths more expensive and better quality would be sheer waste.

Hugh Monie, while resident in India, and occupying the position of headmaster of the textile section of the Bombay Jubilee Technical Institute, collected a good deal of information on the subject of Indian cotton. Some of the present writer's old friends and students have sent par-

ticulars of the amounts of waste often obtained from Indian cotton, and they are surprisingly high. Recently, W. H. Cook, one of the examiners in cotton spinning, who has just returned to England from a two years' business sojourn in India, sent the writer a post card showing the conveyance of cotton through the streets of Bombay. Four cotton bales are shown upon a bullock cart, the total weight being 1,600 pounds of cotton. Incidentally it may be remarked that it is no uncommon thing for English drays to transport a load of more than four times the above weight of Egyptian cotton with two horses.

INDIAN COTTONS.

Name of Cotton	District in which Grown.	Length of Fibre	Dia. of Fibre	Twist	Weft.	Characteristics.
Hinghunghat	Central Provinces	1.1	1/1200	up to 38's		Rarely used in England; reckoned the best in India.
Oomrawuttee	Berars	⅞ to 1	"	up to 18's	up to 24's	Good creamy color; cleaner than some Indian Cottons; strong and moderately uniform.
Broach	Bombay Presidency	⅞	"	up to 18's	up to 24's	Bery deeply tinted; moderately strong and clean.
Dharwhar	" "	¾ to 1	"	up to 14's	up to 20's	Variable; light gold color.
Tinnevelly	Madras "	¾ to 1	"	up to 18's	up to 24's	Strong elastic fibre; dull cream.
Dholleral	Bombay "	.85	"	up to 18's	up to 24's	Dirty; whitish in color; fairly strong.
Madras or Westerns	Western Madras	.85	1/1120	up to 10's	up to 10's	Very poor and dirty.
Coomptah	Central Provinces	.75	"	up to 18's	up to 18's	Dirty; weak brownish tint.
Bengal	Bengal Presidency	⅝	"	up to 8's	up to 10's	Perhaps the dirtiest and worst cotton grown.
Scinde	Western India	⅝	"	up to 8's	up to 10's	Almost or quite as bad as Bengal.

NOTE—Cocoanada, Red Northern, Decca, and Khandeish are other Indian Cottons, the first two of these four being very deep colored. Cloth made from Cocoanada bleaches and dyes very well, when nep is kept out.

There is a good deal of variety in Indian cottons, and some of the best are Hinghunghat, Broach, and Tinnevelly, whilst the worst are probably Bengal and Scinde. The accompanying table of Indian cottons gives much needful information.

The cultivation of Indian cotton received a fillip during the civil war in America about 50 years ago, and it is in greater demand than ever at the present moment. When American cotton is more or less scarce there is a demand among many English spinners for the better sorts of Indian. Neither the soil, the climate, the requirements of the Indian spinners, nor the care and skill of the Indian cultivators are conducive to a good quality of cotton from India.

Just as the River Nile, its annual overflow, water storage, and distribution works, play a remarkable part in the cultivation of Egyptian cotton, so do the monsoons exercise a great influence upon the Indian cotton crop. The heat in India is, of course, very great, since India lies between the parallels of 37 degrees and 8 degrees north latitude, and the greater portion of the country is within the tropics. The question of rain is largely determined by the monsoons or trade winds. It is stated that these blow alternately from the southwest and northeast, the first-named from October to April, and the other from April to October. The southwest monsoon passes over a considerable amount of water, and carries plenty of rain to certain portions of the coast. The northeast monsoon carries little rain with it, so that in some districts little or no rain falls, and there is a great deal of dry arid soil. Great heat and scarcity of moisture are normal conditions in some districts.

Occasionally mixings of Indian and American cotton are made for certain yarns, and it is profitable for some spinners to study and compare the special merits of certain kinds of cotton. One old examination question asked for procedure in mixing 20 bales of low middling Orleans with 10 bales of Dhollera Indian cotton. With a good bale breaking and hopper feed plant it might be best to do the mixing at the feed lattice of the bale breaker, taking portions from two bales of the American for one bale of the Indian. But the different characteristics of these two cottons might lead some spinners to prefer the system of passing cotton separately through the opener and then to place two laps of American for one lap of Indian on the feed lattice of the picker.

CONCEALING FAULTS.

Dissecting a desk calendar recently, it was found that the staples from the wire stitcher were not long enough to go through the calendar pad and clinch; the tops of the staples were badly bent owing to the lack of proper support during driving, and this slack work had been reinforced by the driving in of two wire nails from the back of the pad. All these minor imperfections were carefully concealed by the pasting on of an imitation leather binder before placing in the permanent holder.

How many are concealing faults in their work from day to day? How often would this be entirely unnecessary if they would only take the trouble to properly adjust the machine or the conditions surrounding the production? The time and worry saved that would ordinarily be expended in these efforts at concealment would make the attempt worth while, anyway.

Furthermore, the man who discovers the fault and corrects it, and then goes to his immediate superior and states frankly that this certain lot of work is not right, but that he has located the fault and corrected it, and further suggests that by certain methods the injured stock can probably be used without great detriment to the finished product, has accomplished several important results. First, he has set himself right with his own conscience; he knows he is giving everyone a "square deal." Second, he has raised himself in the estimation of his immediate superior, who appreciates having a man honest and candid in such matters. Even if the defect were caused by carelessness, unless too often recurrent, such an action would not even bring forth a reprimand.

In probably ninety-nine cases out of a hundred such an action would be well received by the "man higher up," and in the odd case it would be found that this "man higher up" was a cantankerous old curmudgeon, who never held a good position very long, anyway, and really did not count in the long run.

Honesty and frankness are better in every way than deception and concealment. An appreciation of this fact will bring a reward worth having.

THE EXPORT SIDE OF THE TEXTILE INDUSTRY.

BY JOHN F. FITZGERALD.

The New England section, strictly speaking, is not the export section that it formerly was. As one manufacturer expressed it, the export trade has been legislated out of New England. The South today, with its supremacy in manufacturing unbleached goods containing a large amount of cotton with a small labor cost, has a large percentage of our exports. Most of her mills have been direct growths of the old New England mills formerly exporting these coarser grades of cotton goods. There is little doubt in the minds of all manufacturers that we can lead the world in manufacturing this particular line, but the New England section having had most of this particular branch of the industry taken away from it, feels especially the difficulty of solving the future of her exports. Her problems will be:

First. To meet the increased cost of present legislation as compared with other sections of the country, especially due to various forms of workingmen's compensation, and other wage laws.

Second.—To increase the efficiency of her plants capitalized on the sound basis of cost.

Even today, although New England has felt this pressure, she has been able to export with increasing quantities the higher grade goods to various countries of the world, and there is no reason to believe that with her already efficient organization she will not be able to develop her labor so that they may have a greater degree of skill and be able to produce on a basis more and more favorable to meet the English and foreign manufacturers on export fields.

We could analyze with interest our present successes and failures in the foreign markets, but as I have not personally traveled in these countries, I do not care to emphasize this part of the paper. What I wish to interest you in is to begin and think in foreign terms; to talk commerce; think commerce, and teach commerce to your employees and those nearest and dearest to you. If we do that, our ways and means will develop more rapidly than we even at present may hope. Our knowledge, then, will help us to really supply what the people in various communities actually need and want, and we will not, as we today are largely doing, try to sell goods according to the tastes of the people in our own country. For instance, in South America we have had little success because we have not adapted ourselves to the styles and the finishes of fabrics sold there. Our trouble is really that we have been too successful with our sales agencies in this country, and view the rest of the world through them. We either will have to force our sales agencies to develop their export departments, or build up sales agencies which specialize in exports, besides, in so far as possible, selling direct through our own representative.

Perhaps one of the most helpful expressions of opinion in this regard of future development may be derived from reading an interview recently held with President John A. Farrell, of the United States Steel Corporation, published in the New York Journal of Commerce on April 1st. He showed how there was some doubt in the manufacturer's mind in regard to the Sherman Anti-Trust Law working so as to prevent any great cooperation of manufacturers for covering the foreign field, but in this regard I wish to call your attention to the difference in public attitude when viewing a trust at home and abroad. Even the most rabid opponent of the trust at home looks with pride upon the success of the big concern in its foreign business. Perhaps a sense of sportsmanship enters into this, the public believing that a trust successful abroad is standing on its own merits, and therefore, is not pampered and protected as at home.

Recently the International Harvester Company published a full page advertisement in one of the Chicago dailies, which brought forth much favorable comment. The advertisement called the attention of the people of Chicago to the fact that two-thirds of their business depended on the foreign market, and that if it were not for their foreign market, 15,000 people in Chicago would be idle for two-thirds of the year. So it is to be hoped that even such men as Mr. Farrell will wipe out all doubt in their minds as to the Government's attitude on reasonable and just expansion of foreign trade.

Furthermore, in this interview, Mr. Farrell made very favorable comment on the present development of our consular service. My trip to Europe convinced me that consuls should be retained without regard to politics. I found some fine types but also some poor ones. Mr. Farrell emphasizes the hope that it would be possible for the Government to employ commercial attaches. In this regard he believes that all the big manufacturers should meet together in Washington, and outline their practical application for all interested. He goes on to show how the manufacturers should begin to take more interest in our reciprocity trade agreements with foreign countries and use their influence with the Government to improve all such trade relations.

It is only when such men as the presidents of our steel trusts and heads of our large cotton mills gather together that effective foreign trade promotion will take place. It is almost impossible to lay out theoretical lines of development, but many points can be brought up which, if properly discussed by the big men in conferences on this subject, would put foreign trade ahead years. Our difficulty today is that each man looks upon his export business as a too personal matter. It is almost as hard to get information from him regarding his export business as it to learn his secret trade processes, but such an attitude, if persisted in, will not develop the broad paths of trade which, after all, are the ones which we all will have to tread. How can a single manufacturer support a steamship line to a definite point with regular sailings? How can a single manufacturer influence one of our big banks to establish a branch in South America or Africa for handling his exchange alone? It is this spirit of cooperation that will ultimately solve our present difficulties.

We must create the atmosphere of commerce that existed in the olden days. Most of the wealthy New England families engaged for many generations in the cotton industry can recall the interest that their ancestors took in the East India and China trades. They keenly followed the clipper ships. Foreign countries also had respect for American ships and traders. In India the arrival of the ice ship from Boston was a public holiday. It is not theory and it is not misplaced oratory to try and get you to think along these lines of good old-fashioned New England, Yankee commerce.

For a minute pause and see how backward we really are in this regard. Germany has an elaborate system of higher commercial education. In the city of Boston it was only

*Presented before the National Association of Cotton Manufacturers.

six years ago that we first provided a school of commerce, and it was not until this year that the foundations for a new high school of commerce were laid. Spanish is only second to English as the most important commercial language of the world. Spanish has been introduced in our schools in Boston and Lynn, but the business men as yet have not considered a boy with a command of Spanish worth one cent more than the other fellow. During the past two months we have had between fifty and one hundred men of all nations, some of them trained for years in the export business, apply for positions at the Boston Chamber of Commerce. The manufacturer is not interested. He is unable to see just how he can use such trained men. It was only three years ago that the state of Massachusetts established a port board. Their work has been far ahead of the community's development. Harbor facilities now are more than adequate for the necessary building up of our great New England port.

Last year only $55,000 worth of cotton goods were exported through the port of Boston, a rather unfavorable picture compared with the clipper ship days. We do not wish to call attention to the fact that most of our New England manufacturers are now exporting through New York, but we do wish to emphasize the fact that foreign trade has become so much a matter of course that New England manufacturers, even with their local pride, have allowed business to go through outside ports at perhaps a greater expense to them. New York is to be complimented for the fact that she has centralized our export business for the United States, but our true condition in foreign trade is shown by the way in which communities have allowed commerce to die in their home cities.

Foreign trade is now a serious problem. We find ourselves in the position that Germany and England found themselves many years ago: forced to sell in the world's markets in order to maintain their great industrial developments. We cannot dump our surplus upon the foreigner. We must remake this surplus into a product which meets even his finicky tastes. His customs and methods must be religiously respected and complied with.

So it is hoped, gentlemen, that when the time comes for you to put your shoulder to the wheel and join in a revival of foreign trade, you will put aside all politics and help create a new Yankee spirit.

GEORGIA COTTON MANUFACTURERS' ASSOCIATION.

President Allen F. Johnson, of the Cotton Manufacturers' Association of Georgia, recently called a meeting of the standing committees of the association to meet in Atlanta. This was the first meeting of the new committees as appointed by President Johnson since his election at the annual meeting in May. The meeting was held at the Piedmont Hotel, where a luncheon was served to the committee members present. Harry L. Williams, the secretary and treasurer of the association, who was present, gave the following list of standing committee appointees as selected by President Johnson:

VICE-PRESIDENTS AND MEMBERS OF EXECUTIVE COMMITTEE.

C. V. Truitt, LaGrange, Ga.
E. W. Swift, Columbus, Ga.
James H. Porter, Macon, Ga.
J. L. Hand, Pelham, Ga.
W. J. Vereen, Moultrie, Ga.
Geo. H. Lanier, West Point, Ga.
Oscar Elsas, Atlanta, Ga.
B. R. Blakely, Griffin, Ga.

EXECUTIVE COMMITTEE.

J. A. Mandeville, Carrollton, Ga.
C. B. Caperton, Trion, Ga.
Clifford J. Swift, Columbus, Ga.
R. C. Freeman, West Point, Ga.

TRAFFIC COMMITTEE.

H. P. Meikleham, Lindale, Ga.
J. D. Massey, Columbus, Ga.
W. H. Hightower, Thomaston, Ga.

LEGISLATIVE COMMITTEE.

S. A. Carter, Atlanta, Ga.
F. B. Gordon, Columbus, Ga.
Geo. W. Hamilton, Dalton, Ga.
C. E. McLin, Rome, Ga.
R. T. Jones, Canton, Ga.
G. B. Scott, Scottdale, Ga.
E. Darden Borders, Thomson, Ga.
D. A. Jewell, Chickamauga, Ga.
P. B. Murphey, Newnan, Ga.
P. D. Fortune, LaFayette, Ga.
T. A. Shipp, Jr., Tifton, Ga.
H. P. Meikleham, Lindale, Ga.
F. E. Callaway, LaGrange, Ga.
T. J. Thornton, LaGrange, Ga.

After the luncheon was served, various business matters were discussed by the committees in charge and adjournment was taken.

SOUTHERN COTTON MILLS AND THE ISOLATED PLANT.

REPRODUCED BY PERMISSION FROM "THE ISOLATED PLANT," NEW YORK.

BY S. T. STEWART.

The Southern cotton mills, from the central station standpoint, are very desirable customers. They have a day load with a load factor of 35 per cent, and they use from 150 to 3,500 horsepower, depending on the size of the mill. In a number of sections in the South central stations have been developing water power plants to enable them to compete with the low power costs of the cotton mills private plants.

Cotton mills considering the use of central station power should be sure that there is a safe margin in their favor. The inconvenience of electric energy, transmitted long distances and transformed several times, should be allowed for. Hydro-electric plants not backed up by steam plants usually fail during three of the fall months, causing complete mill sections to shut down. Transformer troubles are very usual because the South is subject to severe storms, and variation in voltage causes trouble in all cotton mills, as they should have a constant speed.

The present central station charges are from $12 to $25 per year, with a minimum or maintenance and investment charge of from 75 cents to a dollar per month per horsepower installed and they usually require a ten-year contract. The manufacturer should not look lightly on this maintenance and investment or minimum charge, as it has happened, and may happen again, that it would pay him better to shut down his mill for several months on account of lack

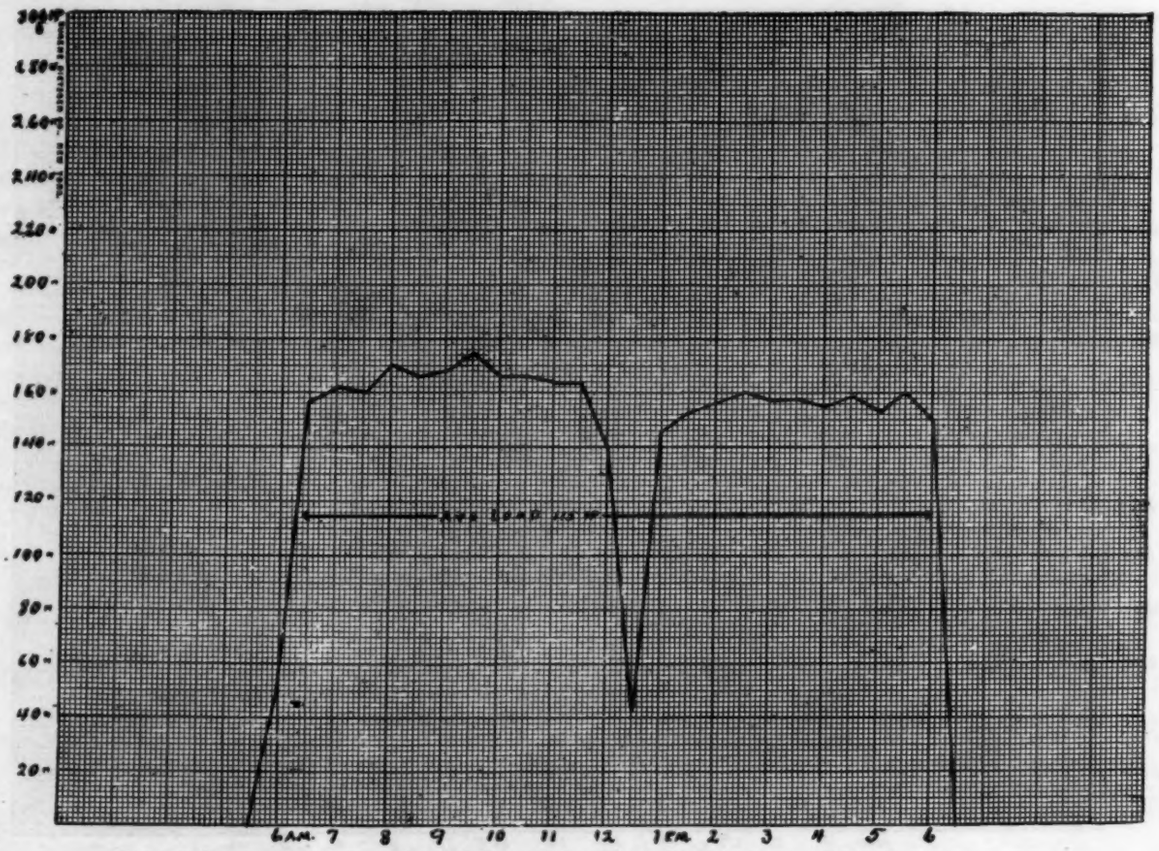


Fig. 1. Power Curve in a Cotton Yarn Mill With 20 C ards and 5,712 Spindles.

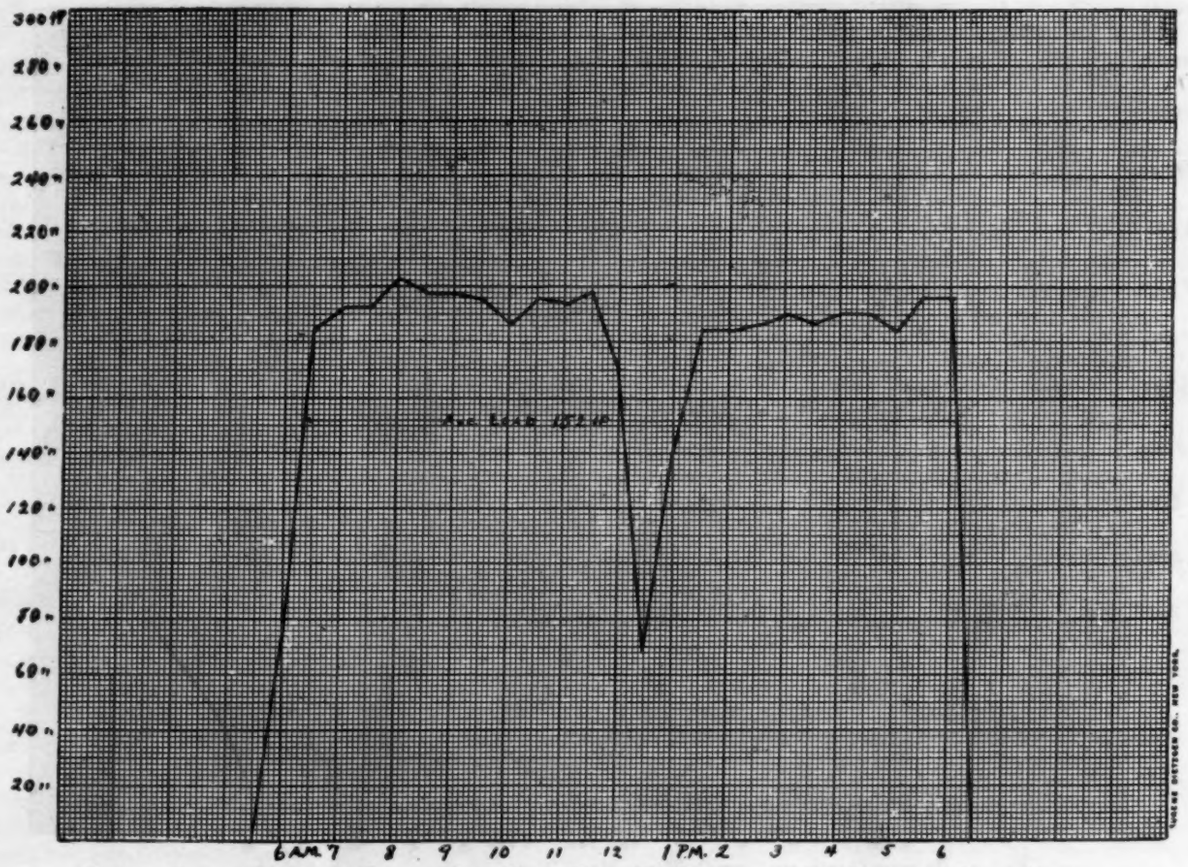


Fig. 2. Power Curve in Cotton Yarn Mill With 25 Cards and 5,712 Spindles, Steam Drive.

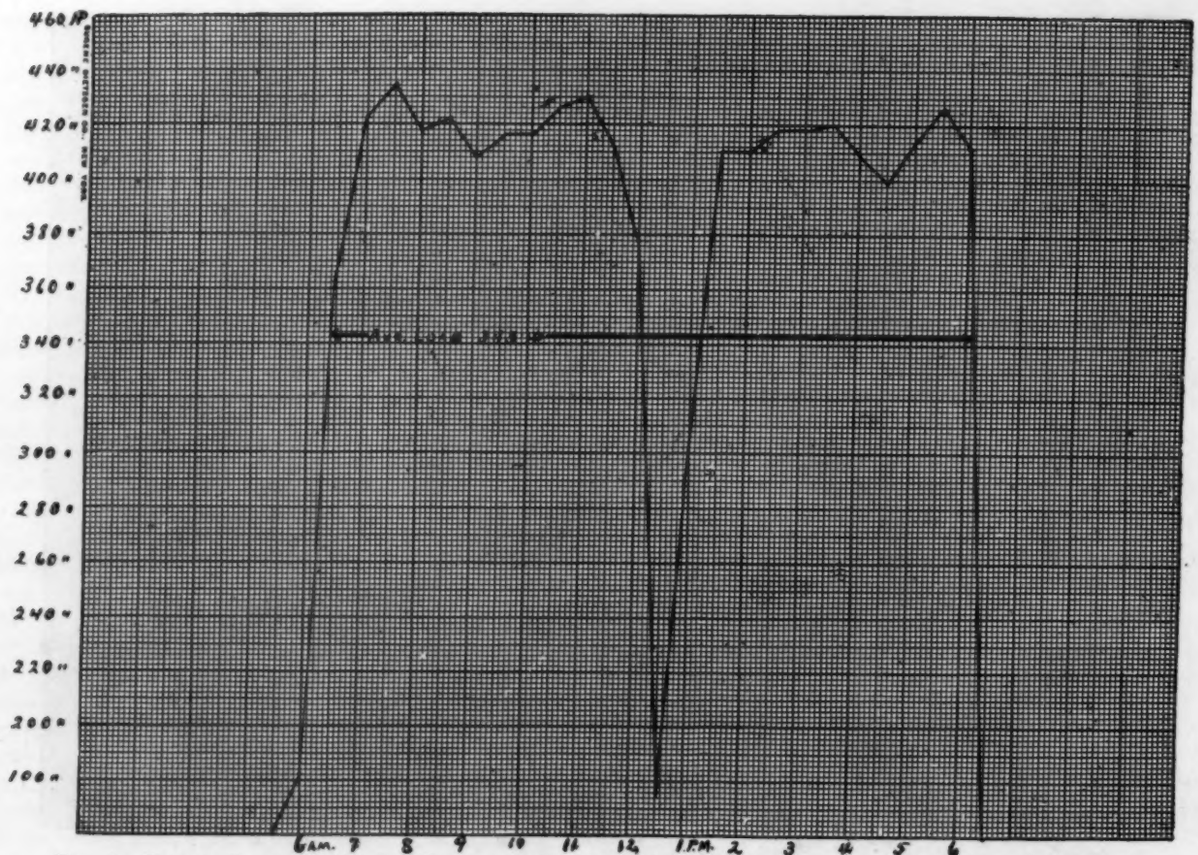


Fig. 3. Power Curve in Cotton Yarn and Cloth Mill With 43 Cards, 341 Looms and 12,767 Spindles.

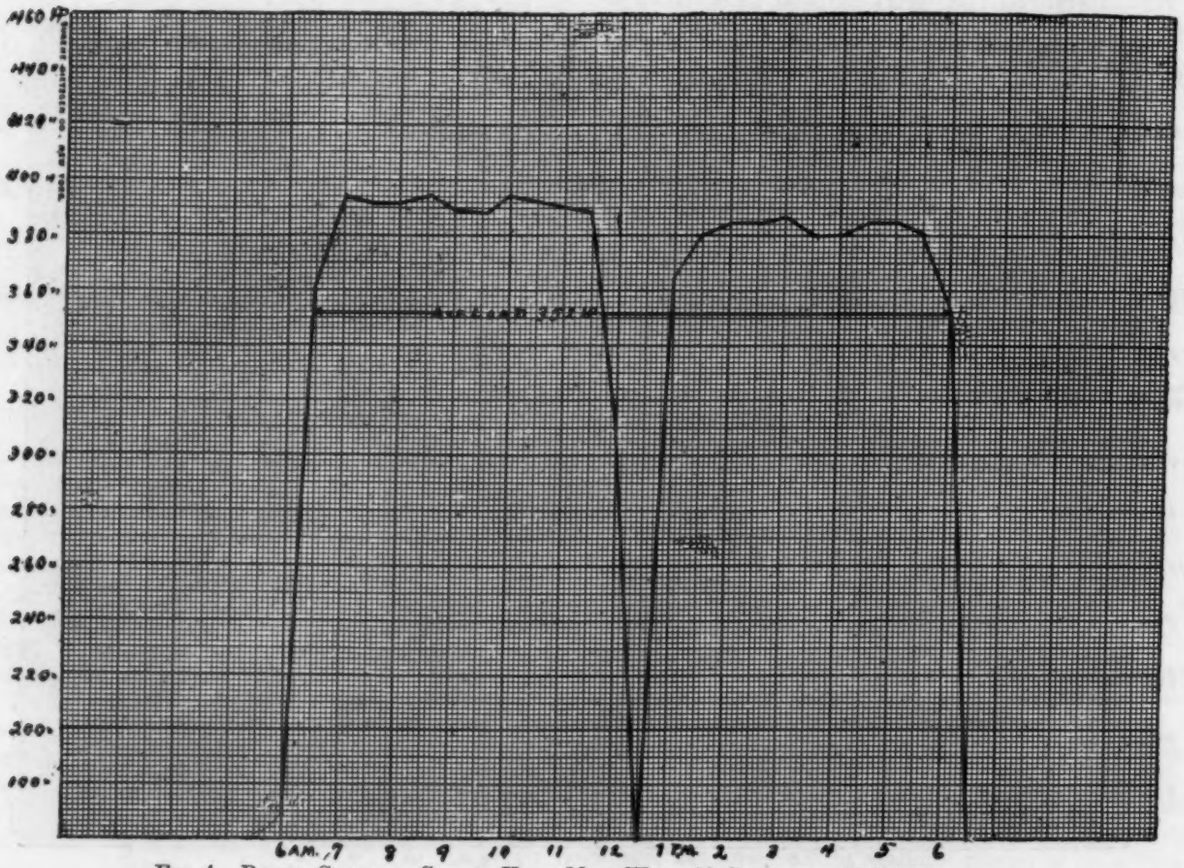


Fig. 4. Power Curve in Cotton Yarn Mill With 98 Cards and 42,500 Spindles.

of orders or high cost of raw cotton against low prices on finished cloth or yarns. If the mill buys its power from the central station it would be compelled when shut down to pay this amount every month.

All cotton mills have to be heated during the winter, and if power is bought coal must still be used and a fireman paid for the five winter months. In the small mills the only labor saved by buying power is the fireman for seven months a year, as the engineer is the machinist, and does all the repairing and oiling of the entire mill.

The cotton mill owner of today realizes that he needs an efficient power plant, and the new mills are generally operating with from 125 to 150 pounds steam pressure, the engines being of the compound condensing Corliss type, and where electric drive has been installed condensing steam turbines are not unusual. These conditions have worried the central station, where millions have been invested in water power development with the result that these companies are canvassing their prospective customers with the best power solicitors that money can employ, and are using every available means to get cotton mill business.

The cotton mill companies using central station power do not advise other mills to give up their own power plants because of the troubles spoken of above, although they do advise electric drive.

The small cotton mill with a simple Corliss non-condensing engine of 125 to 150 horsepower can develop power as cheaply as the central station steam plant of 5,000 horsepower, even though the latter is equipped with the most modern apparatus. This is because the cotton mill has a steady load from the time it starts up in the morning until the whistle blows at night, and after the steam pressure is once brought up to standard it is easily kept there, until night when the fires are banked. Cotton mills with a compound condensing plant can develop power 25 per cent cheaper than the central station steam plant.

The central station can never tell exactly what their load will be. Hence it is necessary to keep the steam up very nearly to the full capacity of the boilers. Consequently when the load drops off the safety valve will blow off until either the load comes on again or the fires cool down. Besides their cotton mill load the central stations have various other loads, such as traction, oil mills, cotton gins, foundries, printing presses, elevators and general commercial lighting and power.

The power solicitor will inform the mill owner that by using their power and installing individual drive they can increase the production of the mill from 12 to 15 per cent, because all machines can be run at a higher speed than with belt drive, and with less breakage of threads.

This promise holds true for a constant voltage only. On machines that should not be speeded up a constant speed is, of course, necessary, and constant speed can only be obtained by a constant voltage. When the thread on the machines break from belt slippage or variation of motors it is the variation of speed that is the real trouble back of it all.

If the manufacturer installs his own generator, operating same by his present power equipment, when the saving is considered, the cost will not amount to a great deal. There will be from 8 to 10 per cent loss in the generator, but there will be a saving from 25 to 50 per cent in line shaft and belt friction. The production of the mill can be increased from 12 to 15 per cent with the same labor or cost and a less power cost. The mill is independent and not subject to shut downs on account of storms, defective transformers, low water, or neglect on the part of outsiders to keep their equipment in repair. Under these conditions should it be advisable to shut down, there is no maintenance and investment or minimum charge to be paid each month, and should the owners wish to dispose of the mill for any reason, there is no string, such as a ten-year contract for power, tied to it.

Of the first cotton mills equipped with an individual drive for supplying its own energy is one of the Jacksonville cotton mills at Jacksonville, Ala. The results after one year's operation have proved very satisfactory. The Henderson mill, at Henderson, N. C., has just finished equipping a new addition to their mill and they also have a direct connected motor at each machine.

Numerous other cotton mill private power plants are being installed or plans for same formed. The cotton mill owners of the South are realizing more and more that for actual cost, efficiency and service the central station can never hope to compete successfully with the owner's private plant.

WELFARE WORK—WHAT IS IT?

We hear much of welfare work from one source or another and it takes many different forms in as many different localities. In a recent article on this subject Edith S. Reider, Secretary of the Advisory Board of Welfare for the International Harvester Company, reminds us that there are as many varieties of welfare work as there are welfare boards. And as the "57 varieties" may have but one thing in common, *i. e.*, the ability to whet the appetite, so also the various kinds of welfare work may have only one point of similarity, the purpose of serving the employees in one or many ways.

To illustrate this statement she tells us of a well-known Eastern firm which is known to give its employees fair treatment (taking it for granted that it is only fair and decent to provide comfortable, sanitary working conditions as well as a living wage) has for years been running a Sunday school, providing a very large auditorium for the purpose. This Sunday school is used by the immediate community, not confining its membership to the employees, nor expecting their attendance.

Another large establishment not only provides almost perfect working conditions within the plants, but sends lecturers our through the neighborhood, showing by the use of colored slides, how ugly backyards may be turned into things of beauty by careful landscape gardening, furnishing flower seeds for those who will use them.

In many other cases, welfare work is just beginning. Perhaps a lunch room for women employees is the only thing that has developed; or oftener, a nurse is at the plant ready to care for emergency illness or injury on the part of employees.

What is "Welfare Work" anyway? Different persons would answer differently, but probably the consensus of opinion among fair-minded, democratic individuals, employers and employees alike, would agree in the main. A firm or a corporation which employs large numbers of human beings in its daily business, feels that those human beings have a right to work under conditions that are physically safe and comfortable; and morally free from danger. Busi-

ness houses are coming more and more to consider this as an obligation just as cities are more and more considering the necessity of providing for the physical and moral safety of their citizens. It is not charity. It is not paternalism. It is simply justice. But in order to see that these important matters are provided for, it is usually necessary that some one individual or group of individuals be held responsible for them, that the work becomes centralized, even while it is diffiused through all the different plants. And while this basis of comfort and safety is being established, the individual or group of individuals, whose delightful business it is to keep everlastingly "on the job," will always find new problems requiring solution.

These problems may grow out of the fact that some plants must depend for their labor, upon great groups of recent immigrants whose serious handicap, their ignorance of our language, indicates the need of classes in English. Or it may be the very small problem of providing mittens and candy canes for a Christmas party for children of sick employees.

We, who spend our days working for the Harvester Company, probably rarely think of the danger of fires, although the newspapers tell us every day of a new, disastrous fire in some big establishment. Most of us have never taken the trouble to find out that the reason why our company is so "backward" in this matter of having big blazes even though it does have to keep great stores of paint and other inflammable stuff within easy reach, is that we have put ourselves into the hands of a fire chief who is as likely to be at the plants at two o'clock in the morning as at two o'clock in the afternoon to see that his squad is on duty. While this eternal vigilance protects property it also protects human life; for when a big plant burns, the fire does not always stop at joists and timbers. The state laws require that factories shall have a fire drill for their employees once a month. Our fire chief is not satisfied with that. In our twine mills where hundreds of girls are working, the fire drill occurs every week; and the girls are so accustomed to it that it looks like a frolic (well-ordered to be sure), when they go laughingly scurrying down the aisles at the sudden call of the fire signal, vanishing from the building in the twinkling of an eye. If it should some time prove to be a real fire that sent them out, they would probably not know until they were safely out of the building that it was not a drill but a disaster from which they had escaped.

But whatever may be the hazards incident to industry, none is more insidious in its attack, nor more widespread in its ravages than the great white plague to which, physicians tell us, we are all exposed daily, whether we work in a mahogany-furnished office or within white-washed factory walls, or whether we work not all. We cannot avoid it by staying indoors at home. Indeed, we should make ourselves the more liable because of our reduced vitality. Because we cannot avoid this daily exposure, we may be thankful that we are working for a company which is doing much in the care of its employees who have succumbed to tuberculosis.

In a great establishment like the Harvester Company, the great vital problem of securing safety where thousands must work with or near machinery, requires constant education of every employee and the special attentions of a separate force of intelligent, alert men who must refuse to be satisfied with anything that endangers human life. While the whole trend of enlightened public opinion, of the efforts of captains of industry, of labor unions, and of social service, is toward the greater conservation of human life, the average workman is still fool-hardy in this respect. He still waits for a Titanic or an Iroquois to bring him to his senses He is like the old colored man who had been guilty of such a grave offense against the law that the judge had to sentence him to death. After pronouncing sentence, the judge regretfully turned to the grey haired culprit saying, "Well, Sam, have you anything to say?"

"Yes, suh, yo' honor, I'd jes like to say,—Dis yere is gwine to be a mighty good lesson fo' dis yere chile."

It behooves us, then, to be more fore-sighted in interpreting the meaning of "Safety First" in terms of practical efforts to save human life.

Perhaps some one says "But this is not welfare work. Welfare work is clubs and recreation, millinery classes, gyms and red geranium beds."

After a girl has worked ten hours in the factory, she might be willing to stay another hour to learn how to make a hat, but I think she would probably prefer to go straight home, knowing that at the end of the week she will draw a living wage which will make it possible for her to buy her hat or still learn to make one on Saturday afternoon after she has had a rest.

As for recreation, there is a wide divergence of opinion among workers, as well as employers as to what should be the attitude of an establishment in regard to this matter. Our company has always stood ready to encourage the play instinct which all normal individuals, both juvenile and adult, possess. This is indicated by the furnishing of room, light, heat, etc., for the various clubs, as well as by cash contributions.

But the International Harvester Company has not done much in the way of providing or guiding our recreation. Personally, I prefer to select and guide my own recreation. But I am thankful that if I should fall down tonight on an icy pavement and break my leg, I need not be utterly discouraged because our City Fathers have never been able to draw up an ordinance that will protect us from such inconveniences, since I belong to the Employee's Benefit Association and should be entitled to benefits.

The company has not put much money into marble pillars and red geranium beds. They remind one of hospitals and homes for incurables anyway. But when a man has spent twenty years of his life working for an establishment, it must be a comfort to him to know that instead of spending his last days in a "home" he may retire with a pension which will take care of his old age.

Many companies are now showing somewhat the same spirit as that of a charming little childhood friend of the writer. After cutting out paper dolls one day, she neglected to pick up the litter of paper which had fallen on the floor. One of her playmates looked worried and whispered "What would your mother say?" "She'd make me pick them up," replied the little girl thoughtfully. Then flashing a smile at her friend, she said, "I'm going to pick them up now before I'm made to."

Don't be afraid of difficult undertakings. Be glad of the opportunity to show your metal.

PAPER BOX MANUFACTURING.*

BY J. ALBERT ROBINSON.

Forty years ago the only machines found in a paper box factory were the scorer, corner-cutter and the shearing machine. The bulk of the work of forming and finishing the box was done by hand. During the subsequent years closely following there was quite a development of automatic machinery, which has been developed and improved up to the present time. Today it is a very small shop indeed that does not have the most of the processes involved in the manufacture of pasteboard boxes automatically carried out.

The development of any great industry almost always carries with it a series of consequent lesser industries which are, however, quite necessary for the complete welfare of the former. An important example of this class of attendant industries is that of the so-called "paper box," "pasteboard box" or "cardboard box" manufactory. The great centers of the shoe industry, the hat shops, the knit hosiery and underwear factories, etc., all demand vast numbers of pasteboard boxes in which to ship the output of their plants. Box factories are, therefore, always found in such localities, and frequently these plants will also have their own box shops as part of their manufacturing equipment. Indeed, the demand for paper boxes is almost endless, and today large cartons and crates are replacing smaller receptacles made of wood. The paper box industry is perhaps as widely disseminated as any important manufacturing business that can be mentioned.

According to the statistics of manufactures compiled from the Thirteenth Census of the United States, taken in 1910, there were 949 paper box manufacturing establishments in the country, with an invested capital of $35,000,000. The value of the yearly output was stated as $54,450,000. About 44,000 persons were employed in this industry.

There are three general classes of paper boxes. The so-called "folding" boxes are those which may be shipped in the folded or flattened condition. The "set-up" boxes are the ones most ordinarily found, and are shipped usually in the shape they have when in use. The shipping containers are boxes made either of fiber board or of corrugated cardboard, and are rapidly replacing wooden boxes, or shooks, for the shipment of many materials, notably cereals and package goods of that nature.

While practically every process employed in the manufacture of either one of the three boxes just mentioned is accomplished by means of some machine or other, and the number of machines in any plant whose business is at all considerable is therefore great, it is not a very difficult matter to get a working idea of the essential features of the principal machines to be found in operation in a typical factory.

In the case of plants making shipping containers the previous statement is not true, as this is a comparatively new business, and standard machines for making boxes of this kind are not yet on the market. The manufacturers design their own machinery, and most of them seriously object to the publication of any matter descriptive of the appliances they use.

Passing to the consideration of the machines employed in making boxes of the other two types, it is to be noted that practically the same procedure is followed in making boxes of both the set-up and the folding variety. Printing the cardboards or the paper cover, as the case may be, may be considered the first step of the process. A large percentage of the smaller boxes have to be printed on from one to four sides and in from one to three colors. Thus it happens that one finds in many of the larger plants a rather unusual assortment of high-class printing equipment.

What is really the first step in the actual making of the box itself consists in cutting the cardboard to the desired size, and scoring it in the lines along which the board must later be bent. There are two principal types of machines for performing this operation. In machines of the first type, the cardboard is placed on a moving horizontal table which carries it under revolving circular knives, and these latter do the necessary cutting and scoring. The other type of cutting and scoring machine is very similar to a printing press. The knives are set up in a form very much as type is arranged in printing, and the cardboard placed on this. The form then either passes under a revolving cylinder, or else the necessary pressure is applied as in the case of an ordinary job printing press. With either class of cutting and scoring machine, adjustable-speed drive is absolutely essential in order to secure the highest possible operating efficiency. Moreover, the greater number of speeds possible—within reasonable limits of course—and the more readily the speed adjustment may be made, the higher the efficiency of operation. When the feed is automatic the best speed will depend upon the quality of the stock being cut and scored, while in the case of the hand-fed machine, the skill of the operator must also be taken into account in determining the proper speed.

After the cutting and scoring, the corners of the cardboard are cut away.

The box next goes to the gluing or staying machine, which appliance brings the edges of the cardboard together where corners are to be made, and glues a narrow strip of paper or thin cloth over the corner along its length. This entire process is automatic, and here again adjustable-speed drive is essential to high efficiency of operation. If the speed of the machine be kept at the value adapted to gluing or staying small boxes of a good quality of cardboard, the spoilage is liable to be very great on a run of the larger boxes, or on those made of a lower grade of stock.

The slitter is used for cutting into the proper widths the paper needed for staying corners and for covering boxes made of unfinished board. A covering and trimming machine for applying this paper to boxes of the class just mentioned will take different strips of paper and paste them on the under side, unite them, one overlapping the other, and fasten them on the box automatically at one operation.

Table gumming machines are frequently found. They are used to apply semi-liquid adhesives to the paper. The machine will gum and deliver on the carrier work of all sizes, either small or large, of any width up to the width of the machine, and will apply the adhesive evenly in a thin coating without soiling the outer surface. The copper jacketed glue reservoir empties directly into the brass pot on the machine, and when hot glue is used, is equipped with a hot water heater heated by gas, which furnishes the hot water circulating system for heat-

*N. F. P. A. Quarterly.

ing the gumming materials in both the reservoir and pot.

On boxes where it is not desirable to glue the corners together, wire stitchers are used that make staples similar to those used in binding magazines.

The paste or gum used is frequently prepared in the factory in some form of mixer or cooker. There are other machines used in different box-making plants, but as they are more or less of a special character it will be unnecessary to describe them here.

A characteristic of most paper box shops is the large amount of space which must of necessity be devoted to storage purposes. A fire that once gains headway in such locations is apt to result disastrously.

The principal fire hazard in the paper box shop is that of waste paper and cuttings. A number of operations, such as scoring, trimming, cutting corners, etc., simply eliminate pieces of paper or pasteboard from the raw material and add just so much to the waste pile. Care should be taken to see that the waste cardboard and paper do not come in contact with steam pipes. The waste should be carefully gathered up and baled under pressure as fast as it accumulates and not allowed to remain in piles or bins where the presence of oily matter may induce spontaneous ignition, or where the careless disposal of matches or cigar butts may have an ever-ready medium for action.

While cleanliness may be more or less desirable, from the manufacturer's point of view, in any sort of workshop, it is absolutely necessary that the paper box factory keep its products free of dirt, oil and dust. If the boxes are not turned out clean and fresh looking, there is little or no market for them. As a means to promote this end the individual electric motor drive for each machine is being strongly advocated in paper box factories.

Transmission of power by electricity is revolutionizing the methods of driving machinery in many industries. In box-making establishments the utility of individual motor drives on machines is most apparent in the economy of flexibility of speed adjustment, which is very essential in this industry.

Care should be taken to see that such equipments are installed in strict conformity to the National Electrical Code.

The glue pot offers the next particular source of hazard in the box shop. These may be heated by gas, steam or electricity. The modern electric glue heater is well adapted to box factory service, but most factory plants use gas and steam for heating glue. Some few use both electric and steam or gas heaters. In any case they are generally provided with a water jacket. Occasionally small kerosene oil stoves or gas stoves are used to heat the pots. The principal hazard in connection with these devices lies in allowing the heat to remain on after closing hours. By so doing the surrounding bench or material that may be left in contact with the heaters becomes ignited. The electric heater offers certain points of superiority over the other methods, in that there is no open flame present. It is very essential, where this type of heater is used, that pilot lights be provided on the electric circuit and that care be taken to see that the electric current does not remain on after closing. In many cases the heating of glue pots by electric current has not been satisfactory, and factories using them have in some cases replaced electric heating by steam or gas heating. The principal objections have been that the electric heaters have failed through burn-outs or similar troubles, and that too much time has been required to heat up in the morning, thus delaying the work.

There are a few miscellaneous hazards that are occasionally met with in the box shop. Where printing is done the usaul hazards of this art are present, due principally to the presence of naphtha for cleaning, inky rags and paper, oily waste, etc. Some special gumming and varnishing require a naphtha-thinned material.

An important indirect hazard resides in the ready susceptibility of the stock of finished goods in box shops to serious water damage. All finished goods and piles of stock should be placed on skids. Factories should be provided with tarpaulins, and an organized salvage corps would be of distinct advantage. It would be desirable for plants equipped with automatic sprinklers to carry a form of insurance which indemnifies against loss from water occasioned by accident or defect, generally known as sprinkler leakage insurance.

A NEW LABOR-SAVING STOREHOUSE.

For some years the mills of the Ludlow Manufacturing Associates on the Chicopee River, have been served by storehouses one-story high, and measuring about 40 by 150 feet. Land was very cheap and the storehouses were scattered over an area of twenty-three acres. They were so spaced that no more than one-third of the land area was covered by buildings. To connect these storehouses with the mills an extensive system of trackage was used, amounting in all to more than ten miles. The jute bales were stacked in the storehouses twenty feet high. It is obvious that the expense of handling was very heavy.

To overcome this expense and also to accomplish certain improvements in the fire risk, Charles T. Main, engineer, of Boston, was commissioned to develop another type of storehouse which would do away with most of the manual labor of handling goods. The result is an eight-story building, 215 by 68 feet, built of brick with concrete floors and mill construction roof. This is arranged for practically automatic handling of materials by means of paddle conveyors and a spiral chute conveyor, three of the former connecting the storehouse with the new No. 11 mill building 57 feet distant, across two railroad tracks.

The new building has two end sections for storage, each 100 feet long. Between them is a 13-foot conveyor building running right across. The conveyor building is separated from the storage sections by heavy solid brick walls with tin-covered fire doors, operated automatically, at each opening.

Structurally, the brick walls, 16 inches thick on the four lower floors and 12 inches above, are supplemented by cast iron columns throughout the structure as aids in carrying the load of the floors and contents. Across the building from a footing in the walls to the central row of columns, run 15-inch 42-pound steel I-beams, each being 34 feet long. These beams are nine feet apart and each is supported by one intermediate column in addition to the support at the ends of the beam. The beams are thoroughly fireproofed with concrete and carry 5½-inch concrete floors pitched from center to side walls, the center being 6 inches higher than the side. This provides natural drainage through scupper holes passing through the walls.

The roof, of mill construction, consists of 3-inch spruce plank covered with tar and gravel and carried on 8 by 12-

inch hard pine girders. These girders in turn are carried by 7-inch diameter hard pine columns with the same spacing as the cast iron columns in all the floors beneath. The first story measures ten feet from floor to floor at the wall and 10 feet 6 inches at the center. The other stories measure 8 feet 6 inches from floor to floor, the depth at center being the same as at the wall and therefore giving the floors the same pitch as the second. The net head room on all floors above the first is about 6 feet 9 inches. The roof is pitched one-half inch per foot, this being 17 inches higher at the center than at the sides.

The building was figured for a total load of 250 pounds per square foot or a net load of contents of about 200 pounds. In the roof of the conveyor section there are two skylights six feet square, each with a 24-inch ventilator and a third ventilator in the center.

Each section on each floor has nine windows on each side and four at the end, besides one door midway on each side. These doors and windows measure about 4 feet 7 inches in width. The conveyor building has a double window on the north side and a single window on the south, supplemented by a blank window outline opposite the spiral chute conveyor. The end walls, as well as the four walls on each side of the conveyor house extend 24 inches above the roof. The foundations, as well as piers under the columns on the first floor, are made of concrete.

The interesting feature of this storehouse is the method of delivering raw stock from the storehouse to the mill and then delivering finished goods from the mill to the lower floor of the storehouse. The storehouse, which runs almost due east and west, is located on the south side of State street, Ludlow, and has a 7-foot concrete platform alongside a track on the edge of that street. Stock is delivered across this platform onto a 45 degree conveyor which carries it up and dumps the bales (about 400 pounds each) at any floor desired. The bales slide on the two bars forming the base of the conveyor and are shoved along by paddles carried on two endless chains operated on wheels driven by an electric motor.

On account of the inclination of this conveyor much difficulty was experienced at first in arranging a baffle for each floor which would positively throw the bale off the conveyor without either toppling it over backwards down the conveyor or catching the lower corner of the bale between the paddle and the baffle. After a considerable amount of experimenting with a conveyor and a series of baffles a curve was developed which would give the desired result, and this has now been fitted as a baffle to all the floors for this purpose.

Bales to be delivered to the mill are taken from the store room into a spiral conveyor eight feet in diameter, located at one end of the central conveyor building. By this means the bales are conveyed by gravity to a power conveyor at the third floor, which carries them across two platforms and two railroad tracks to the new No. 11 mill where the stock is delivered on the first floor. In a similar way gravity chutes from the fourth and fifth floors of the mill carry finished goods to the first floor of the storehouse where they are held until shipped from the platform on either side of this building.

This new storehouse has a capacity about equivalent to thirty of the older single-story buildings. Each section has capacity for 2,500 bales of jute, or 500 tons. The total capacity on the seven floors devoted to storage of raw stock is 35,000 bales or 7,000 tons.

The same capacity in buildings of the type previously used could have been provided for a figure 25 per cent under the cost of the new storehouse and conveyors. The cost of operation, however, including labor and power would have been so great as compared with the cost under the new conditions that it would not have paid to have put in the cheaper arrangement. In other words, the difference in operating cost will much more than offset the difference in interest and depreciation charges on the excess cost of the new building. This is entirely in addition to incidental advantages, such as improved fire risk, economy of ground space, etc.

ORGANIZATION—THE SPIRIT OF PROGRESS.

BY C. R. TROWBRIDGE.

Not long ago Elbert Hubbard had occasion to visit a state hospital for the insane.

Walking over the beautiful grounds half a mile from the main buildings, one morning, he came across an attendant in charge of twenty-five patients.

The attendant was a little chap, a sort of half portion. Many of the patients looked and weighed twice as much.

The comparison aroused the Fra's curiosity. He joined the attendant in his stroll and walked with him for some distance. In the course of the conversation, and Hubbard was all questions, he asked:

"What is to hinder half a dozen of these big fellows behind you getting together and setting up a job on you and fleeing to the woods. If they should get at you all at once you wouldn't stand a ghost of a show. There is no help within half a mile at least and you are not armed (this he had told Hubbard)."

The attendant looked at his questioner in severe rebuke, then smiled and replied:

"You belong right here all right, friend. What is to hinder these men getting together and setting up a job on me? Why, the fact is if they could get together with anybody or anything, they would not be here. That's their trouble."

The badge of sanity is the ability to organize.

Organization is a modern policy. The organized man is a power, he moves shoulder to shoulder with his brother; the unorganized man is merely a part of a mob, with no chart or compass to guide him.

Organization is the spirit of progress and the spirit of progress is the greatest asset a business or an individual can have.

The more people we can work with and for, the bigger and better you and I are.

We are living in an age of organization. Commercial and industrial enterprises, cities, men, are thriving upon it.

We are living in an age of organized interests. Men get together to discuss things, to better conditions. They are doing it in a spirit of progress.

Reciprocity, mutuality, cooperation are combined in this spirit, and the greatest of these is cooperation.

Competition may have been the life of trade once, but it is no longer so. Competition died when the inventive

*Extracts from an address before the National Association of Trunk Manufacturers.

genius of American engineers devised machines that will manufacture beyond our present economic wants. Competition, then, became suicidal and destructive and anything that is suicidal is dying—is *dead*. We have passed through the savage age, the stone, the competitive, and now we are passing into the cooperative. We will not be here so very long, anyway, and soon Death, the kind old nurse, will come and rock us to sleep—and we had better help one another while we may.

The idea of the brotherhood of man is no idle vacuous dream and this idea of brotherhood is coming about, not through the preaching of ethics or morality, but it is coming as a matter of self-preservation.

The strength of unity is indisputable. Few things do more to retard the natural progress of a business or of a movement than a lack of cooperation.

The energy expended on a "tug of war" is not constructive. It is like one man pumping water out of a basin while another pumps it back.

There are two chief reasons for lack of cooperation; one is that men do not agree on what is best to be done. The other is that selfish motives deceive men into thinking that they will be able to get more by going alone.

The remedy for the first is comparison of views, exchange of ideas and the establishment of the right idea in the minds of all. The remedy for the second is the knowledge that the common good is also the real good of the individual. Selfishness is often but another name for ignorance. If a man desires to obtain the most good for himself he should know that his legitimate share of a great common good is greater than any possible good he could obtain for himself, alone. The narrow-minded man fishes with a hook and thinks to have the whole catch for himself. The broad-minded fellow joins with others in using a seine and his portion of the returns exceeds by far what he might get with the hook.

Cooperation is greater than competition and we should constantly bear in mind, the great fundamental laws of the universe—the laws of inter-dependence. There is not a thing in the world which is not dependent upon some other favorable thing or condition. We all need each other and therefore should cooperate with each other. He who loses sight of this important law is bound to become worthless timber in the life of the world.

Cooperation is the most effective way to secure the most of what each one desires to obtain.

Simply because one is in the same line of activity as another is no reason why he should attempt to destroy him. A certain amount of mutuality is absolutely necessary to live. Increased consumption is the rule of every line of human endeavor.

There are bigger markets than the world ever offered and there are bigger profits for the man who can eliminate the grouch, get rid of his grab instincts and regulate his gobble and guzzle.

Organization is the spirit of progress.

You must stand for progress or fall.

The world may furnish many opportunities, appreciation will quicken some motives and the onward movement of the world can change some conditions, but that spark of fire—the spirit of progress—must come from within, must spring up in a moment of noble resolve, must never be allowed to die, never to want, never to waver.

Organization binds men into a fraternity, which spells length of days, because it "serves" and its service is based on specific knowledge.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

Confidence is rather slow in asserting itself, and as yet nothing has occurred to break the prevailing inertia which hangs over nearly all departments of business. Not only is this true in this country, but there seems to be a world-wide slowing down of business, due to economic causes. It is an undisputed fact that this country is in an excellent condition, commercially, industrially and financially, and when confidence is once restored business will immediately take a fresh forward start. Lack of confidence is our greatest obstacle at this time, coupled with a disposition to await greater certainty as to the forthcoming cotton crop.

Final figures on the 1913 cotton crop, announced on June 24th by the Census Bureau, place it as the largest the United States has grown, with the exception of that of 1911. At the same time the estimate of the total value of the crop shows it was the most valuable ever produced.

The idea has gone abroad that the New England cotton mill owners were rather disposed to take a selfish view of whatever small advantage the southern manufacturers might secure from the revision of the tariff, and were not in favor of the schedule submitted by the spinners at their recent Washington meeting. At this time the New England manufacturers are opposing a plan suggested and urged by the southern cotton shippers for a reform in the manner of weighing cotton at the mills there. The present arrangement is for the cotton to be weighed at the mill warehouses. The shippers want it weighed at the freight platform or steamboat wharf, and by putting this system into use there could be an immediate testing for tare. The shippers' reason for wanting this plan put into execution is so as to avoid the long-deferred claims where there are disputes as to the weight of bagging and ties to be deducted. Under the present system the deduction for the tare is often made months after the delivery of the cotton. The extra expense it would entail is given as the reason for the New England mill men's opposition to the proposed plan. Southern cotton shippers are to meet a number of New England manufacturers at an early date in an effort to reconcile their differences.

Foreign trade papers indicate that, in spite of opposition from several sources, prospects are favorable for considerable cotton mill building in Lancashire. This activity is attributed partly to the fact that many of the mills are desirous of putting their strong reserve funds to some use, and partly to the willingness of directors to do themselves a good turn by increasing the number of directorships in their possession. The promoters are evidently confident of a general revival of the cotton trade, although others foresee difficulties in the threatened shortage of help.

Called on for an expression as to business conditions

by COTTON'S representative, JAMES D. HAMMETT, president of the Anderson and Orr Cotton Mills at Anderson and the Chiquola Manufacturing Company at Honea Path, S. C., said:

"Crops have been first-class in this country for the last few years, and the outlook this year is very flattering. With this condition, business in all lines should have been good and the future promising.

"We all recognize the fact that business has not been profitable, and this is particularly true of cotton manufacturing. What is the cause of the depression when natural conditions call for prosperity? In my judgment, the constant and apparently popular criticisms of corporate property is one of the leading troubles, and until this unfair criticism, and at times abuse, is lessened, I fear we will have unsatisfactory conditions. These unsatisfactory conditions will operate against the owners of property, and also against wage-earners and producers as well.

"Another need is to have more business men and fewer theorists in the legislative halls, and have the public pay less attention to the clamor of self-constituted reformers who have no knowledge of business conditions and little regard for anything but action that will satisfy their personal vanities.

"A cotton mill receives about 20 cents for the cloth that makes a shirt that sells for $1.50 to $2.00, and, notwithstanding the fact that the mill must pay for the raw material, labor and all expenses in manufacture, and receives only 20 cents for the cloth, the mill is abused because the shirt does not sell for less, and the mills are accused of reaping undue profits.

"Another class of agitators are now in the field endeavoring to disturb the friendly feeling that has always existed between employers and employees. Fortunately, this class is so anarchistic in their utterances and motives that our good, native-born Americans will refuse to be led into unfair and dangerous action, and when they see the true motives behind these imported agitators, they will surely refuse to contribute to the funds necessary for the existence of the idle and unreliable agitators.

"It is a long lane that has no turning, is an old saying, and I believe we are now on the verge of a better day, and that confidence in the integrity of our business men and faith in the stability of our business enterprises is near at hand, and that we shall, at an early date, enjoy that prosperity to which we, as an honest and energetic people, are justly entitled."

A. H. BAHNSON, treasurer of the Arista Mills, Winston-Salem, N. C., stated to COTTON'S representative that he feels optimistic, for the reason that prices on yarn and cotton fabrics are so unsatisfactory at present that he cannot believe they will continue, and a change for the better is bound to come.

T. L. WAINWRIGHT, president and treasurer of the Stonewall Cotton Mills, at Stonewall, Miss., expressed himself as feeling rather pessimistic over conditions, saying:

"The cotton mill industry through this state (Mississippi) and this section, and, as I understand it from correspondence and the press, throughout the United States, is in a rather deplorable condition. A large percentage of the cotton mills are actually losing money. A great many are now shutting down or running short time, and it is the exception rather than the rule where they are breaking even or making any profits, and it is, indeed, a result of some fortunate buying of cotton or something of the kind where the profit is sufficient to pay more than a half dividend after maintaining the physical condition of the property.

"The Payne-Aldrich tariff has been reduced by the present Congress an average of nearly 75 per cent, which is already beginning to work a great hardship on the textile industry of this country, but more especially the finer grades of cotton goods manufactured mostly in the East, and largely in South Carolina and a few other sections of the South. This indirectly reflects on the coarser cotton goods manufacturers, in that it drives the finer goods manufacturers into competition with the coarser goods; then there are various other causes for the universal depression in business, such as the increased cost of labor and materials to the railroads and a decrease in their revenues, both brought about by repeated adverse national and state legislation and other national legislation which has been passed and pending that has given rise to a feeling of distrust and uneasiness throughout the country."

The following additions and prospects are noted:

The Elm City Cotton Mills, LaGrange, Ga., are adding roving frames.

An order has been placed by the Manchester Cotton Mills (Georgia) for new twisters.

The Merrimac Manufacturing Company, Huntsville, Ala., have placed an order for 1,400 additional spinning spindles. They now have 92,480 spindles on print cloths, organdies, percales, etc.

A large order for additional machinery has been placed by the Riverside Manufacturing Company, Anderson, S. C., from pickers to spinning, inclusive. They now have 20,000 spindles on skein yarns, 20's to 30's.

Crawford & Co., of Savannah, Ga., have closed a contract for equipment to clean cotton.

High Falls Manufacturing Company (North Carolina) have placed an order for new roving frames.

The Bellevue Manufacturing Company, at Hillsboro, N. C., are planning to build a new mill.

The Denison Cotton Mills, Denison, Tex., expect to enlarge their mill at an early date. They now have 14,000 spindles on ducks and drills.

The Kosciusko Cotton Mills (Mississippi), which has been in bankruptcy since last year, has been reorganized under the name of the Ayanaug Manufacturing Company, and has been incorporated with a capital stock of $125,000. The officers of the new organization are: J. W. Saunders, president and treasurer; L. D. Oldham, secretary, and T. H. Moore, superintendent. The mill has 12,500 spindles and 324 looms for chambray and shirt cloth production.

The Queensbury Mills, of Richmond, Va., have been incorporated, with a capital of $425,000, to manufacture cotton yarns. The officers are: H. H. Chalkley, president, and Andrew D. Christian, secretary.

Steady progress is being made toward the construction of the new Bettie Frances Cotton Mills, of Alexaander City, Ala., and it is expected that the plant will be completed and equipped ready for manufacturing by October. This mill will make underwear yarns, and 5,472 spindles will be the initial equipment. The mill has a capital stock of $100,000.

The Grantville Hosiery Mills, at Grantville, Ga., is planning to add considerable new machinery to its equipment, orders for which will be placed at an early date. It now has 5,000 spindles.

The Tallapoosa Mills, Tallapoosa, Ga., have placed an order for new cards and spinning.

Ira F. Phillips, Louisville, Ky., is contemplating the erection of a cotton mill in Louisville. It is expected that contracts will be made at an early date.

The French Broad Manufacturing Company, Asheville, N. C., have placed an order for quite a large addition to their plant.

The Aldora Mills, Barnesville, Ga., are planning to add to their loom equipment.

NEW ENGLAND MILL SITUATION.

The cotton mill situation has not improved any during the past month. The promise of better things that were held out for a time in the month of June has not been fulfilled. The uncertainties resulting from the Claflin receivership have served to intensify a difficult problem, and the nearness of a new cotton crop has tended to make large buyers of goods hold off. The crop prospects seem very bright, but they have not yet had their normal effect in merchandising channels. The credit conditions of buyers are being watched more carefully because of the Claflin troubles, and sales of commercial paper for jobbing and other mercantile institutions have been restricted by the same cause.

The uneasiness in financial circles in this whole section has been increased by the railroad complication and by the slow signs of recovery in general trade. In many respects New England is pessimistic, but signs are not wanting that manufacturers in this quarter are making a firm effort to meet the hard conditions that have been laid down in the readjustment resulting from new tariff regulations. Thus far New England cotton manufacturers are agreed that their own immediate business has not been as seriously injured by direct competition from abroad as they were looking for. At the same time they do see that the scaling down of values has set new limits of prices on merchandise, and until they can readjust labor and other producing costs to the levels that obtain abroad, they feel that they will be forced to work on unprofitable margins. In meeting the new conditions on yarn dyed goods, many mills have brought out new cloths, while others have reduced prices in order to stifle foreign competition at its possible inception.

The Amoskeag Manufacturing Company has reduced the price on its AFC 27-inch ginghams from 9¾ to 9¼ cents, and Toile du Nord fine ginghams, made by the Parkhill mills, have been reduced to 9½ cents from 10 cents. In addition, these cloths are offered in many new designs and colorings, as well as many jacquard and dobby weaves. These new prices will give jobbers an opportunity to sell these goods so that they may be profitably retailed at two yards for a quarter, and this value should do much to discourage the introduction of foreign ginghams of a less serviceable character at the same price.

Several of the yarn dyed cloth mills have brought out what are termed romper cloths and fine madras, and also many varying lines of low-priced yarn dyed crepes. These goods are intrinsically meritorious, and they offer to the cutters and ready-to-wear manufacturers every desired opportunity for offering finished garments that will discourage the introduction of foreign-made cloths for the same purposes. The question of whether the mills can make money on the new goods remains to be tested. One of the most interesting offerings is a moire madras made in the York mills on a patented loom. The cloth is made on a chambray ground, and the moire effect is woven in. It is claimed that this is the first time anything of this kind has been successfully done with goods of gingham construction, and already buyers are offering to take all the goods the mills can make for the coming spring season.

The Boston Manufacturing Company and the Whittenton Mills, old manufacturers of fine yarn dyed goods in this country, have brought out several new lines of fancies in sheer weaves for the coming season. These mills were undoubtedly much hurt by the ill-balanced ratings in the cotton schedule affecting fine yarn dyed cloths, yet their managers are making a sincere attempt to meet the new conditions by offerings that are distinctly and typically American in design and production.

The market on wide sheetings has ruled very steady, and the market on pillow tubings has also been practically firm for the month. The burning of the Naumkeag Mills, in which Pequot sheetings were made, served to attract attention to this quarter of the market. The agents of the company believe some part of the property will be replaced in time to permit the retention of the market on these products. There were stocks of the fine sheetings held in the gray in warehouses that were not burned, and it was also true that the bleachery of the concern was unhurt by the fire that destroyed the main plant. The losses sustained by the mutual fire insurance companies from this fire were the largest they have ever been called on to pay. The explanation of the total loss of the sprinkled mills is found in the fact that the water system of the city failed.

Wide print cloths have not held their value during the month. The falling off has amounted to about 3/16 of a cent a yard. Narrow print cloths are very dull. Stocks of print cloths at Fall River have accumulated in the interval and amount to about 1,400,000 pieces of all kinds of goods. The American Printing Company has run fairly steady and the Algonquin Company is running nearly to its full capacity. The printers engaged on fine yarn goods and specialties for converting purposes have been very busy. The Arnold print works has work enough ahead to keep its force employed throughout the summer. The Windsor works are running all their machinery, largely on plisses, printed crepes and specialties. The Pacific works have been running about 44 machines. The various companies of the United States Finishing Company have more than 50,000 pieces of work ahead of the volume booked at this time a year ago, and the print works departments of the company are very busy.

The actual volume of curtailment among the cotton and yarn mills of the section is hard to estimate accurately. At New Bedford there were 25,000 looms idle at one time. At Fall River hardly 80 per cent of the machinery is in operation. Many mills throughout the smaller centers are running five days a week or running a limited amount of the machinery. Some of the Rhode Island mills are closing Saturdays. The yarn mills have been finding trade harder than for some years. Some mills that have been employed on specialty yarns for weaving for four or five years have recently been in the market for miscellaneous work, and two or three of the mills of the New England Cotton Yarn Company are closed.

The openings of new goods for spring in fine dress cottons have been watched with close interest by the mills. It

is now agreed that women are wearing a larger yardage of material in their dresses; that they have used more sheer printed goods than for many years past, and that the prevailing and suggested styles indicate that larger quantities of fine cottons will be wanted during the coming season. At the same time buyers have been slow in placing their orders for next spring, and the tendency on the part of both converters and jobbers is to lessen orders rather than expand them for future delivery. This may all change when the true inwardness of the Claflin matter is made known, but at this writing new business on fine goods for spring has been disappointing.

The trend of fashion is toward very sheer materials in cotton goods, in contrast with the very rough and heavy cottons that were featured for the current season. The ratine fad has passed, and foreign cotton novelties made on worsted looms are no more in demand for another season. The call now is for voiles, fine lawns, organdies, lace cloths, leno weaves, etc., all sheer, and offered in white or on light printed grounds.

Staple bleached cottons have been charged fully in the interval, but advance business has been very meagre. The best known branded lines are well under order for the next few weeks, but new business must soon come along or cloths will begin to accumulate in the early fall. Fine and lightweight duck have sold moderately and steadily. The heavier qualities have been very slow. Denims are still to be had for prompt delivery. Staple tickings were reduced ½ cent a yard by the Amoskeag Company. No change was made in the base price of staple ginghams, but a lengthened discount was allowed to the jobbers.

There has been considerable talk in manufacturing circles of late concerning the general trade in cotton goods all over the world. The decline in export shipments, together with the limited business offering from the large export markets, is noted in conjunction with the gloomy reports of conditions in Manchester. Should this tendency continue, the possibilty of English goods being dumped upon the American markets is not a remote one, and the increasing imports from the United Kingdom are already taking on a new significance. All of these fears may be readily dispelled, of course, if the normal effects of good crops soon begin to be felt.

The large machinery dealers are particularly careful in the attitude they are assuming toward new enterprises. The Draper Company, in the first half of the year, installed 12,500 of their automatic looms and still have fair-sized orders on the books. At the same time neither this company nor any of the large machine agencies are disposed to regard the immediate outlook as one inviting large investment in new mills. Most of the machine companies are trying to maintain moderate working forces on full time, but it is no easy task, despite the repair work that is being done in many large plants.

One of the commercial agents of the Department of Commerce reports that a resident of South Africa, who has had many years' experience in the trade, desires to get in touch with American manufacturers of cotton goods, including bleached goods, prints, denims, khaki, striped drills, ginghams, cottonades, and made-up articles, such as cheap skirts and second-hand clothing. Correspondence may be in English. In writing refer to file No. 12665.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKET.

BY H. AND B. BEER, NEW ORLEANS.

During the past month the weather in the cotton belt has not been altogether satisfactory to permit favorable progress being made by the growing crop, for while climatic conditions have been favorable in the eastern half of the cotton region, weather conditions of late have not been satisfactory west of the Mississippi River. As a result, the improvement noted in the eastern half of the belt has been about offset by unfavorable weather conditions in the Southwest; as a result, the market shows but little change compared with one month ago.

The crop situation in the South Atlantic states is very good at the present time, and as there is a full acreage planted in that section this year, prospects are favorable for a bumper crop with anything like good weather during the remainder of the growing season.

In the Mississippi Valley states crop prospects, while favorable, are not quite so promising as they are in the eastern portion of the belt, but as there is an increase in the acreage in this territory, the yield promises to be as large, if not larger, than last year's, with anything like average weather conditions during the balance of the crop-making period.

As regards Oklahoma and the important state of Texas, the outcome of the growing crop remains very uncertain. The dry weather, which set in after the excessive, incessant rains in May, has continued for seven weeks, except in West Texas, where beneficial alternating rains were had. Texas and Oklahoma are now badly in need of a general soaking rain, and unless relief is had in the near future, rapid deterioration of the crop will undoubtedly take place.

The early planted cotton in Texas and Oklahoma has withstood the dry, hot weather very well, but even this cotton is commencing to suffer for the want of moisture, while the late planted cotton, which comprises about 35 per cent of the crop of the United States, is in a critical condition, it having been in no condition to endure torrid weather.

On July 21st the government issued the following weekly report by states:

Texas—Late planted cotton is suffering from drouth. Early planted cotton is suffering in some sections, but is holding its own in others. Apparently, cotton in sandy soil is standing the drouth better than on hard soil. A general soaking rain is needed.

Oklahoma—Cotton is making fair growth, except that some of the late planted is retarded.

Arkansas—Cotton made satisfactory progress in most counties and its condition is fair to very good.

Louisiana—Cotton is improving and fruiting well.

Tennessee—Crops improved. Most of the cotton district still needs rain.

Mississippi—Cotton greatly improved.

Alabama—Cotton is clean and well worked, and is generally in good condition. The growth was normal and is being laid by, but is shedding in some localities.

Georgia—Crops made satisfactory growth and are in good condition and well cultivated. In some sections early cotton is reported the best for years.

Florida—Precipitation generally deficient, although cotton is doing well.

South Carolina—Continued improvement took place under frequent showers. There is some complaint of local drouth.

North Carolina—The weather was generally favorable for crops. Early cotton is unusually well advanced.

THE KNIT GOODS MARKET.

The opening of the past month was a rather optimistic one, as quite a number of large knit goods buyers were in the market, and no hint of weakness to any great extent had been uncovered. The only reduction reported at this time was a line of 25-cent goods, which started out with quotations 5 cents a dozen over last year, and was reported to have revised its price to the old basis. Quite a good deal of the business for next spring was still to be placed, and selling agents were confident that a large part of it would be placed before the buyers returned to their home cities. Salesmen back from their trips invariably reported no encouragement on fall business. Jobbers stated that they were 40 to 60 per cent behind in that business so far, and would not operate further until the fall season actually opened. In the staple lines of cotton hosiery the best information was that the smaller jobbers who do not usually go to New York have bought in a fair way. Cheap silk lines, such as artificial silk hosiery, were said to be regarded with favor for another season by many jobbers. Mercerized numbers were offered at attractive prices, but information received on business done was not very encouraging to the mills.

It is reported from the Chicago market that a leading wholesale men's furnishing goods jobbing house gave one important manufacturer of regular silk, fiber silk and plaited silk half-hose the largest order that this particular manufacturer had ever recorded on his books. The mills that have been able to secure business on the higher grade silk and fiber silk hosiery are located principally in Pennsylvania and New Jersey, and the bulk of the business has been done on good hosiery to retail at 25 and 50 cents. A good volume of business has also been done on hosiery to retail at $1.00. An analysis of the knit goods business indicates that silk hosiery is now a staple article of fashion, and that it cannot be questioned further that the consuming public are willing to pay as much as 25 cents for hosiery—if not silk, at least a hose of full silk appearance. This naturally has curtailed the distribution of cotton hosiery.

On sweaters of the heavier and cheaper grades business was not satisfactory, and many mills have not their production satisfactorily under order. At summer resorts and for evening wear, silk sweaters, either of pure silk or artificial silk or part worsted, have been very popular with the women. Most of these sweaters, however, are imported goods, as no American manufacturers, for some reason, have attempted to make this particular class of sweaters.

As the month wore on, women's underwear, particularly the mesh goods, seemed to be proving a good seller among the jobbers and retailers in the Middle West. Also, in silk and other knit underwear the demand was gratifying, but not particularly large. As a whole, the knit underwear business in the Middle West was satisfactory.

In an address before the Jobbers' Association of Knit Goods Buyers at the Waldorf-Astoria, Lincoln Cromwell, of William Iselin & Co., seemed to see a bright side to the underwear trade, and says summer business is on a strong basis. More seasonable weather will no doubt help out the underwear line, he indicates; and, according to his opinion, the tariff scare is not justified.

The underwear trade is convinced that the stocks of heavy-weight goods carried over from last winter by the jobbers have been greatly to blame in the slowness of the buying for next spring. With due exceptions, the present season in summer underwear has been a good one with all distributers. Hosiery buying continued slow, the usual estimate being that the percentage was about 50 to 60 per cent of the same business one year ago.

As the month closes it is recognized that the orders for spring business placed by the knit goods buyers is not up to normal, although the majority of the buyers have gone home. A number of buyers took samples back with them or memorandums, but it is recognized in the market that some of the buyers have been trying to give the impression that the prices in a few instances were soft. Some of the mills may try to hasten things by sending their men out again. With the exception of a few specialties and some boys' and misses' goods, the advance hosiery business has been slow in coming in. Some houses estimate that they have 65 per cent of their usual business already on their books, made up largely, they say, of orders from the smaller jobbers. In the higher price silk lines there is practically the same report of only a portion of the jobbers' usual business being received so far. If the President and Congress could bring themselves to the point of considering an adjournment and giving the business of the country a much-needed rest from adverse legislative measures, in all probability business would soon settle down and the incoming crops would tend to increase orders materially.

THE YARN MARKET.

The trade usually looks forward to slow business in yarns during the months of July and August. However, the opening of the month indicated a few sales of 25,000 to 100,000 pounds, but as a whole the market was quiet. There were some inquiries for eastern single combed yarns, but two-ply combed yarns were very quiet. Inquiries for mercerized yarns continued, but knitters seemed to be slow to buy. Many plants took advantage of the Fourth of July week to close for repairs and stock-taking, and in some mills a still longer period was utilized. Weaving lines continued quiet, and some lines that had been quite active began to show signs of letting up.

A little later on in the month knitters began to make more inquiries for sweater yarns, but this demand was still far below the normal proportion. As the month drew to a close there was a little demand for combed yarns in spots, principally single combed peeler. Southern frame spun combed peeler sold on the basis of 25 cents for 10's. Small quantities of 16's sold for 26½ and 27 cents, and 18's for 27¼ to 29 cents. There is a demand for mercerized yarns in spots from a single case to 5,000 pounds, but the larger users of mercerized are not buying to any extent. Manufacturers of carded yarn hosiery are, as a whole, in much better shape, so far as business is concerned, than the makers of combed yarn goods. There were sales of 20,000 to 50,000 pounds of yarn to makers of carded yarn hosiery, and there was a considerable variation in prices quoted by the dealers and spinners. Sales of coarse numbers were made on the basis of 20 and 20½ cents for 10's, white stock. Spinners generally quoted 21 and 21½ cents basis of 10's

for white stock, but they are not booking contracts at these prices. Sales of 10's, 11's and 12's, tinged stock, were reported to have been made on the basis of 19 cents for 10's. Weaving lines continued quiet. Spinners are remaining stiff on prices, and their quotations are ½ cent to 2 cents above the prices in the market. In all probability the incoming crops and the cessation of legislation, provided Congress ever reaches the point where they are willing to quit, will cause an appreciable betterment in general yarn market conditions.

Following are recent quotations on the Philadelphia market:

Southern Single Skeins.

8s	18 @19½	10s	18½ @19
12s	19 @20	14s	19½ @20½
16s	20 @21	20s	21
24s	22½	26s	23
30s	25		

Southern Two-Ply Skeins.

4s to 8s	18 @18½	10s	19
12s	19 @19½	14s	19½ @20
16s	19½ @20½	20s	21 @21½
24s	22½	26s	23 @23½
30s	24½ @25	40s	29 @29½
50s	35½ @36	60s	45

Carpet and Upholstery Yarns in Skeins.

9-4 slack	19 @19½	8-4 slack	18½ @19
8-3-4 hard twist	17 @18		

Southern Single Warps.

8s	18½ @19	10s	19 @19½
12s	18½	14s	20 @20½
16s	20½ @21	20s	21 @21½
24s	22½	26s	23
30s	25	40s	24

Southern Two-Ply Warps.

8s	18½ @19	10s	19 @19½
12s	19½ @20	14s	20 @21
16s	20½ @21½	20s	21½ @22½
24s	23	26s	23½
30s	25	40s	29½ @30
50s	36		

Northern Two-Ply Carded Peeler Skeins.

22s	23	24s	23½
26s	24 @24½	30s	25½
36s	28½ @29	40s	31 @32
50s	37	60s	45 @46

Two-Ply Combed Peeler Skeins.

20s	28 @28½	24s	30 @30½
30s	31½ @33	40s	36 @40
50s	42 @45	60s	47 @54
70s	58 @63	80s	67 @71

Southern Frame Spun Yarn on Cones.

8s	19 @19½	10s	19½ @20½
12s	19½ @21	14s	20½ @21½
16s	21 @22	18s	21½ @22½
20s	22 @23	22s	22½ @23½
24s	23 @23½	26s	23½ @24
30s	25½ @26		

Northern Mule Spun Carded Yarn on Cones.

4s to 8s	21½	10s	22
12s	22 @22½	14s	22½ @23
16s	23 @23½	18s	23½ @24
20s	24 @24½	22s	24½ @25
24s	25 @25½	26s	25 @26
30s	27 @27½	40s	31½ @32

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	26 @26½	12s	26½ @27
14s	27 @27½	16s	27½ @28
18s	28½ @29	20s	29 @29½
22s	29½30	24s	30 @30½
26s	30½ @31	30s	32 @32½
36s	35½ @36½	40s	39 @41

COTTON MANUFACTURING.

MANAGEMENT OF A FANCY WEAVE ROOM.

BY L. O. BUNTON.

Fancy weaving is comparatively new to the South and there are almost numberless details that must be considered in the management of a fancy weave room that do not have to be considered on a plain job. On account of the complexity of the business it is absolutely necessary for the man in charge to have some system of records; for it is impossible for a man to keep everything in his head as some men do on small, plain jobs. The problem is to have a system that is coherent, fairly complete, and not too expensive to maintain. My idea in this line is that a system should be as simple as is possible in consistency with the inclusion of all stress on this last clause for the reason that many of the very best are not trained bookkeepers.

When an order is received at a plain mill running staple goods no one but the office force know anything about it unless there is some unusual feature attached and in that case the superintendent writes a note or tells the overseer to make the necessary changes. Instead of receiving large orders at rare intervals a fancy mill almost daily receives comparatively small orders for many varieties of fabrics. As the fabrics are usually made to order and include many different weights, construction, colors, and hundreds of weaves it is necessary to have a copy of the order or at least a part which gives all details necessary to the manufacture and delivery of the goods.

When the weaver gets a copy of an order, the first thing he should do is to see that he has a sufficient number of feeds, pick gears, and any other supplies that will be needed to make the goods, and if not they should be ordered at once. In this connection it is valuable to have a perpetual inventory of reeds and gears. This can be kept on a small memorandum book or in the back of the order file. This is very easily done by entering the kind and number of reeds and gears as they are received and by having all broken ones saved until they are counted and deducted from the inventory. By looking at the inventory and the division of looms the weaver can tell in a minute whether or not he has the needed supplies available.

A sufficient number of shelves should be provided to keep every different kind of reed and gear to itself and when not in use they should be kept there. This will require close watchfulness but it is very essential, for a mix-up of these parts can cause more confusion, loss of time, and bad work than almost any other detail of similar character. Of course, the weaver can count these parts when he receives an order but he can keep the inventory with much less work, and especially so if the shelves are at some distance from his desk.

After seeing to the supplies, the next step is to give an order to the warping or beaming department. This order should specify the order number, style, color, number of yarn, pattern, for laying-in, if colored work, beams, ends, length and date needed.

There is in use a tag system in which the weaver or designer gives to the warping or beaming department his orders in the form of a tag containing all necessary details. This tag is made in duplicate, one of which is fastened to the beam and the other returned to the office when the beam is made. This system is followed up and a tag is returned to the office at each step of the work. The data on these tags is entered on a book in the office at regular intervals and the person in charge can tell at a glance where every

*Read before the Southern Textile Association.

part of the order is located—provided no one has made a mistake about returning the tags—personally I have not had much success with this system for reasons before mentioned.

When special yarns have to be made the weaver should give the preparatory department an order in time to have them ready when needed. By having a few warper combs cut down, most of the warpers can be run on a standard number of ends and the sets can be filled in on the warpers with combs having a fewer number. By this method much work can be saved in changing the number of ends on the warpers. When the warping or long chain beaming department finishes an order it should be turned over to the slashing department. The order should contain all facts necessary for the slashing department as well as the warping. The back of the order should be ruled so the slasher

No._____

WARPING ORDER

_____191__

TO OVERSEER OF SPINNING:

Please warp the following section beams:

_____**Beams with**_____**body ends, and**_____**selvage ends each.**

_____**Beams with**_____**body ends, and**_____**selvage ends each.**

Seven Warps Per Beam.

Style No._____

Order No._____

Commence Warping_____

Section Beams per set on Slasher _____

Ends in Warp_____

_____
Overseer of Weaving.

Approved

_____
Supt.

THE WARPING ORDER.

tender can put down the exact number of cuts or yards made on each style. The order should then be turned into the weaver or designer and entry made on the customer's order.

Considerable foresight is necessary to keep warps of all styles that are not running in the weave room and not get too much yarn tied up on a few styles. For instance, if 15 looms are all that are necessary to meet the required delivery on a certain style, or that number of looms are all that are available and there are 20 beams to a slasher set, then 5 beams would be left over. If the mill was running 100 styles, which is not unusual for the last few years, it would be an easy matter to get several hundred beams on the floor and at the same time have looms waiting for warps. The man in charge of this work should have a report every Monday showing how many warps on each style will run out during the week, and how many warps on the floor, this will give him a chance to plan the work back to the warpers and have the right warps coming through at the right time. This report will also show how many warps will need to be drawn. A daily warp report is also a great aid but the weekly report is more valuable, because it takes two to three days to get the stock through the warping, slashing, and drawing-in departments.

After writing the warping orders, the overseer should give the foreman of draw-in room orders for drawing the warps. These orders should contain the style number, reed, spread and spaces for the name of draw-in hand, chain builder and harness builder. The back of the draw-in order

DRAW IN ORDER

Style _____

Beam St. _____

Ends on Beam _____

Cuts on Beam _____

Dent Reed _____

Width in Reed _____

Drawn by _____

Reeded by _____

Harness Built by _____

Inspected by _____

Date _____

_____

_____

_____
Overseer

THE DRAW-IN ORDER.

should contain the harness lay-out unless the person whose duty it is to build harness understands the work well enough to figure the lay-out from the draw-in draft. This part of the business can be simplified by having a list of the reeds and spread for each style where it can be easily seen and by giving the harness builder one lay-out for each style and have him keep them on file. The draw-in orders should be filed in the order they are to be drawn and when a draw-in hand is ready for a warp the trucker or foreman gets the order from the file, gives it to the draw-in hand and puts up a warp to correspond with the order, the harness should be built and marked before the warp is put on the draw-in frame and the chain should be built and tagged by the time the warp is drawn. When the warp is drawn the foreman takes up the order and the data on it is used to keep a record of the stock and the work done by the draw-in hand. At a place convenient for the fixers there should be a list showing the filling and gear to be used on each style, also the width of the goods.

When changing styles the fixer can look at this list much easier than he could go to the office and ask what reed and gear to use. Also when there is a great deal of changing of styles, the overseer should keep posted on a bulletin what styles he wants put on. It is comparatively easy to keep track of the stock until it gets on the loom and then it is somewhat difficult to find at any time how much is on the

loom beam. Some mills have a series of numbers on the style tag and the timekeeper goes around each day and punches out a number on every loom that has had a cut checked up that day, but this requires a great deal of work. My system is to keep track of the amount that goes on the loom and deduct the amount baled from this to get the amount on looms at any time, loose goods in cloth room is counted as being on the loom. When the last of order has been put on the looms then the stock should be checked up by measuring the beams with a cut measure made as the slasher beam is filled.

On a job that runs several numbers of filling and is constantly changing styles each loom should have a filling box and the fixer should change the filling when putting on a warp of a new style. These boxes cost money but they will pay in the long run, for it is almost impossible to prevent mixed filling without having a box to each loom. By having a box to each loom it is not necessary to change warps to get all styles using one number of filling together, but new styles can be put on anywhere old styles run out. Each morning the weaver should give the spinner a report showing number of looms on each filling and changes to be made during the day, this gives the spinner a chance to keep the proper amount of each filling on hand.

Harness Build No. 1	Heddles
" 2	
" 3	
" 4	
"5	
" 6	
" 7	
" 8	
" 9	
" 10	
" 11	
" 12	
" 13	
" 14	
" 15	
" 16	
Total	
	Designor

THE REVERSE SIDE OF THE DRAW-IN ORDER.

A complete record of patterns is absolutely necessary. The pattern book should contain a clipping of each style and draw-in and chain draft and all the details necessary to manufacture them, also a quarter yard swatch full width with complete detail ticket should be kept on file. An ordinary day book does good service as a draft file, the pages of the book are numbered and the drafts for each style are placed in the book at the page corresponding with the style number, this makes it very easy for the draw-in hands or foreman to find drafts when required.

The preceding remarks refer almost entirely to fancy work but the following will have some bearing on plain work. There are a great many mathematical problems to overcome and the eternal problem of human nature is a very important factor in the reduction of seconds, but these are entirely separate subjects. We are describing systems at the present time. Nearly all mills now have the looms numbered and the loom number written on the cloth, as soon as an imperfect place is found in the cloth, a ticket with the loom number and the kind of imperfection written on it should be put in a place convenient for the weaver to get it. When the weave room and cloth room are separated by a partition only, a hole should be cut in the wall and a box should be fastened to the wall on the weave room side and just below the hole. The grader drops the ticket through the hole just like mailing a letter, and the weave room overseer or second hand should look into the box at least four times a day or every time he passes and get the tickets and give them to the person responsible for making the cloth.

This system is much better than waiting until the end of the day to get the cloth room report, however, the cloth room should give the weaver each morning a report of the number of pieces containing each kind of imperfection, so he will know what to give the most attention. The bad cloth should be shown to the weavers each day even though there is only one piece, for the least break in the system will require several days to mend. The cloth table is the place for the overseer to teach the weavers how to prevent bad cloth. The loom fixers should inspect the cloth on the loom at least once a day and write their initials on the cloth. My experience has been that it is best to have this inspection made at a certain time each day, say just after starting time, for the men are not so liable to forget it or put it off until too late. The second hand should also make at least one regular daily inspection of the cloth, so, also, ought the overseer on a job up to one thousand fancy looms or two thousand plain looms.

The second hand should give out supplies or write orders for them, this gives him a good chance to teach and caution the fixers how to set up the looms to make the parts give the best service. The way to save supplies is to fix the looms so they will not wear out and break up the parts. A record of supplies used on each section is very valuable, for it shows the management who are the efficient men and if properly handled will create a good-natured rivalry between the men and cause each to do his best.

Every one understands pay-rolls, but there are some features about them that are sometimes not so easy on a complex job, when there are many different weights, picks, lengths of cuts, etc. it is impossible to judge with accuracy the cuts in a roll, and it takes too much time and work to measure them, so the best thing to do is to weigh the cloth and figure out the cuts. This is very easily done by keeping a convenient record of the weights of a cut of each style of goods and the time-keeper soon gets this into his memory and does not need to look at the weight sheet. I like this system of checking up the cloth by the loom number for it is much easier to trace an error with this system, as new styles are added almost daily and the price per cut for weaving has to be figured for each, the overseer should have a price constant or rather two constants for good and fair running patterns of each class of goods, by using this system he can get the price per cut for weaving simply by multiplying the picks per inch by the constant.

DOBBY FIXING.

BY THOMAS NELSON.

When dobby looms are ordered the number of harness levers in the dobby is always specified. The dobby that goes with the loom is almost always the right proportion, that is, if a 24 harness dobby loom is ordered the loom would be made so as to accommodate a dobby of that capacity. Very few cases occur with new looms where the dobby is not in the correct proportion to the loom. It is when changing over a plain or a twill loom to dobby work that this trouble will be encountered so that it is necessary to be on the lookout for same.

If a loom is being changed over and a 20 harness dobby is ordered for same and the space is only sufficient to allow of 12 harness shafts being used, it is clearly a waste of money to order a larger dobby capacity than the loom will take care of.

This first cost is, however, not the only loss that will occur, in fact, this is really the smallest loss. The determination of the number of harness levers in the dobby or in other words, the capacity of the dobby that can be used, depends almost entirely on the space between the crank shaft and lay, when the crank is on the back center. This, of course, brings the lay back to its farthest point and nearest the crank so the space between these two points will have to be known in order to get a dobby of the right capacity.

For a dobby of 20 to 24 harness levers there should be about ten inches between the points mentioned. This is figuring on the harness shafts being about three-eights of an inch thick, which is about the average thickness of harness shafts. If the harness shafts are thinner than this, a larger number could be used, or a larger dobby could be used for the same space. When a thinner harness shaft is used, there is always the liability of splitting the shafts when putting in the harness hooks. Extra care is also required in setting the harness.

If more harness shafts are crowded between the lay and crank than this space will conveniently hold, there will always be trouble, as every time the lay will go back it will strike the harness shafts and cause them to vibrate, with the result that the shafts will be continually catching on each other, misspicks resulting; harness shafts dropping and breaking out ends; and making smashes.

Another point which should be noticed is that when the crank is on the back center, the harness cord rollers should be set so that the front harness will be about half an inch behind the lay. This can generally be done if the dobby and loom are in correct proportions, but if by any means the front harness should be set too near the lay there will always be trouble in weaving.

Every part of the dobby should work free, there should not be any binding of the parts in any way. For example, take the index fingers: The outer end of these fingers pass through a grate which separates one finger from another; sometimes instead of a grate of this character, each finger is separated by a wire pin, from the base on which rests the index finger. In either case the fingers should pass clear through without touching either the sides of the grate or the pins, otherwise there will be binding. On single index dobbies a grate is usually used and the index fingers, being much heavier than those used on the double index dobby, do not bind to the same extent. The grate is usually cast in one piece and adjustment can very readily be made. On the double index dobby the guide pins are generally used and it is absolutely necessary that these pins pass clear between the index fingers, or in other words the index fingers should be perfectly straight between the pins.

The index fingers should also be made straight. Unless these fingers are cast straight it is almost impossible to get good results. The index fingers on a double index dobby work close together and unless they are straight and smooth, binding will result and misspicks will be made. If the fingers are not straight or are rough they will all have to be taken out and put on the emery wheel to try and make them straight and to take off the rough places. This defect, however, does not often happen but when it does, there is certainly a lot of work to be done on that dobby before it is in suitable condition to run. Any dobby that will require all this work before starting up is certainly not the dobby to select.

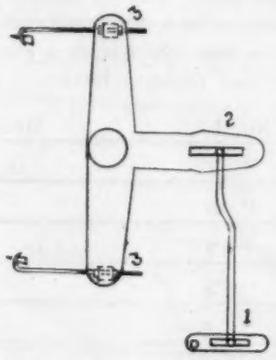


FIG. 1. SHOWING POINTS FOR SHED ADJUSTMENT.

The size of the shed is generally determined by the number of yarn used. On fine yarns only a small shed is required, being just open enough for the shuttle to pass through easily. Anything above this is a strain on the yarn. The greatest strain on the yarn is when the shed is wide open so that if the size of the shed can be kept to its smallest limit, the strain will be reduced to a minimum. This does not mean that the shed will have to be so small that the shuttle will have to be picked extra hard and will have to plough its way through instead of passing through easily. This is one of the fine points in setting the harness on fine work; for if the size of the shed conforms exactly with the size of shuttle used, the pick can be set so as to drive the shuttle easily through the shed, for there is a direct relation between the shuttle, the shed and the pick. If the pick is too strong, the ends are liable to be broken out. The shuttle must also be perfectly smooth and all rough places taken off by rubbing with fine sandpaper.

There are three points at which the size of the shed can be regulated. These are illustrated in Fig. 1 by the numbers 1, 2, 3. When the stud is in center of slot both at 1 and 2 the medium movement will be given to the knives, and the size of the shed can then be very easily regulated by moving the studs in or out according to whether the shed has to be increased in size or decreased. On very fine yarns, where cop filling and very small shuttles

are used and a very small shed has to be made, it is not always possible to get the adjustment at points 1 and 2, so that an adjustment is made by setting the knives at 3 so they will be back from the catch on the jack hooks, when the knives are at the extreme inward movement. In this way the knives will not be brought out so far and the size of the shed reduced. When this adjustment is made, a new timing of the chain barrel generally has to be made or misspicks will result because of the barrel being on the wrong timing.

RELATION OF CHAIN BAR TO KNIVES.

On single index dobbies, it is immaterial which knife is brought out on the first pick. Each bar in the chain

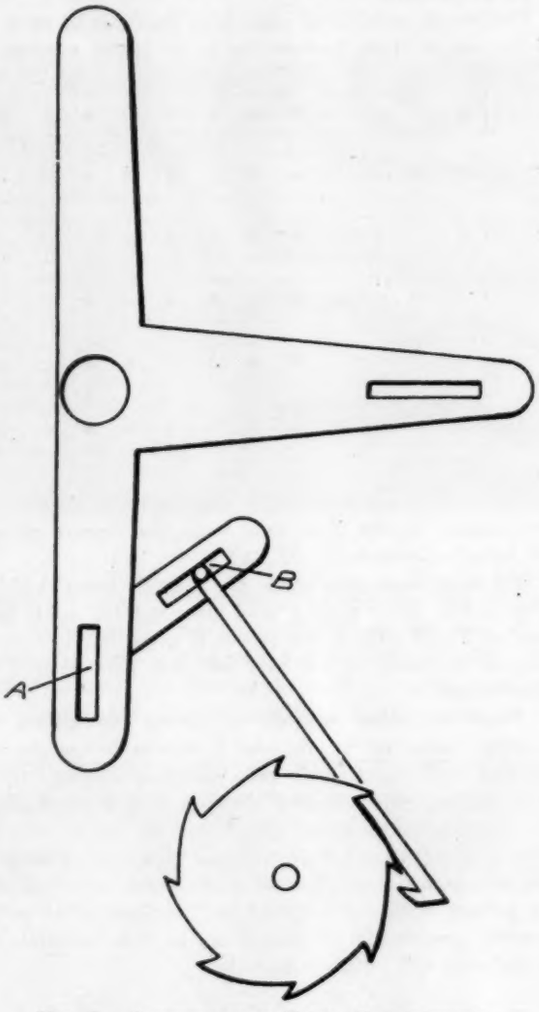


FIG. 2. SHOWING THE PAWL CONNECTIONS.

is pegged for only one pick so that when a peg is put in the chain bar, both top and bottom jack hooks are lowered at the same time so that either the bottom or top knife coming out will raise the harness.

On a double index dobby, each bar in the chain is pegged for two picks. There are two rows of holes in the bar, the pegs in the first row raising the index fingers which lower the bottom jack hooks; the pegs in the second row raising the index fingers which lower the top jack hooks. It will be seen from this that the first row of pegs in the bar and the bottom knife must work together and the second row of pegs and the top knife must work together. The driving arm can be set so that either the top knife or the bottom knife can be pulled out on the first pick, but if the first row of pegs in the chain bar operate the bottom jack hooks through the index fingers, the bottom knife must be set, ready to begin its outward movement when the chain barrel has been turned over.

The usual method of driving a double index dobby is by the pawl which is connected to the bottom of the front rocking arm. On some dobbies two slots are provided for the pawl, as in Fig. 2. The customary method is to have the pawl connected at A and when the extension on the rocking arm is pulled down the bottom knife goes

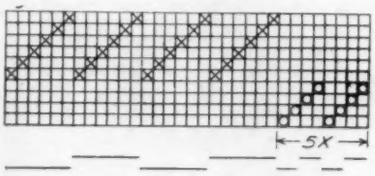


FIG 3

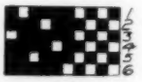


FIG 4.

in and the top knife moves outwards. As the bottom part of the rocking arm is moving inward, the pawl will also pull over the chain barrel so that the pegs in the first row of holes will lower the jack hooks in front of the bottom knife and the harness will be raised on the next pick. If, however, the pawl is connected at B the chain barrel will be turned over when the extended arm on the

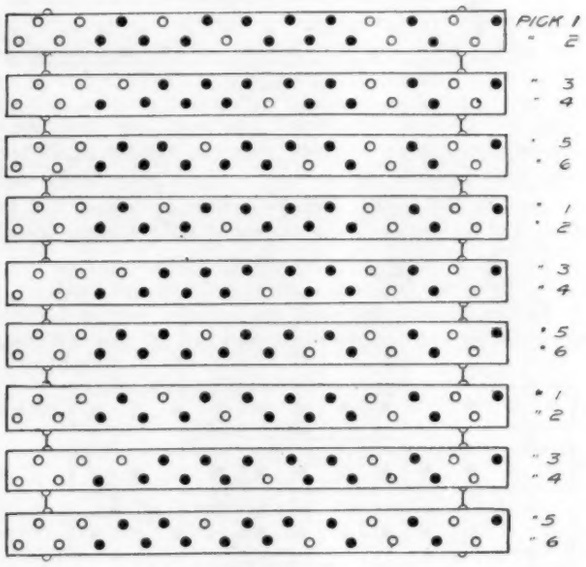


FIG.5

rocker is being raised, which means that the top knife is moving inwards and the bottom knife out.

Now, when the chain barrel is turned over and the pegs in the first row of holes govern the bottom set of hooks, instead of the bottom knife being in so as to catch the hooks that are lowered, the knife is out, so that for the first pick on that bar the second row of holes will be used; and for the second pick, the first row will be used. This means that instead of the picks being put in the cloth in regular order, 1, 2, 3, 4, 5, 6, etc., they will be put in 2, 1, 4, 3, 6, 5, etc., and this will give a ragged effect to the outside of the pattern. The remedy for this is to change the driving arm on the opposite side of the

shaft or gear, in other words, set the knives so that the top knife will be in for first pick.

When a double index dobby is added to a plain or twill loom and the chain barrel is driven by a worm and worm gear, the same trouble will be experienced unless the knives and the chain bar work in unison.

PEGGING PATTERN CHAINS.

There are various systems in use at different mills for pegging pattern chains and in giving instructions for same. In many of the large fancy mills a boy usually

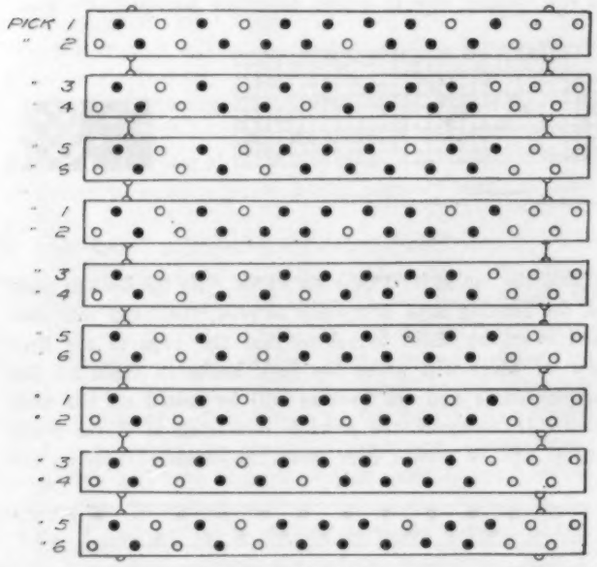


FIG. 6

does this part of the work. The loom fixer will go to the designer's office or room with the number of pattern and style number and receive a chain plan ready built to put on the loom. The loom fixer in asking for the chain will have to state one or two of the following items:

1. The direction the cylinder revolves.
2. Whether the loom is right hand or left hand.

In the majority of cases the cylinder rotates towards the beam so this can be eliminated and all that will then

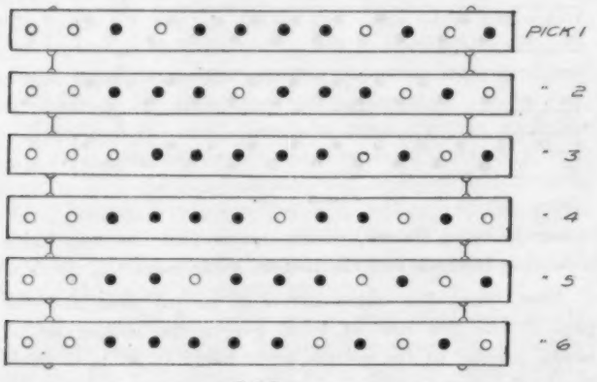


FIG. 7

be necessary will be to state whether the loom is right or left hand. A right hand loom has the dobby on the left hand side of loom and a left hand loom has dobby on the right hand side of the loom. To illustrate the building of chains we will suppose that we want a certain style, composed of 40 ends plain and 24 ends of six harness broken twill. The drawing-in draft for this is given at Fig. 3, and the chain plan at Fig. 4. If the system mentioned is used, and also double index dobbies, the fixer will go to the chain builder's room and ask for the chain for such a style and state whether right or left hand loom is being used. If for a right hand loom, the chain will be pegged as in Fig. 5, but if for a left hand loom as at Fig. 6. Solid circles represent pegs.

A designer in making out his chain plans always uses one system, that is, he always has or should have, *the first harness on the same side in every case.* The only instructions that need be given to build a chain is as follows: For right hand loom peg right to left; for left hand loom peg left to right. Always begin on the first pick as shown in the illustration.

The longest number of chain bars that can be used on any pattern is eight, because this is the lowest number of

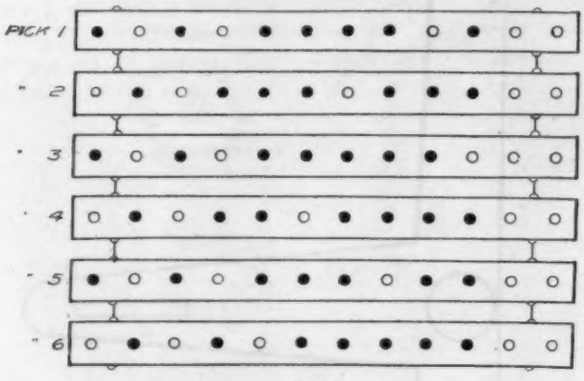


FIG. 8

bars that will pass around the chain barrel. If the pattern repeats on less than eight bars, the repeats of bars will have to be made.

The same chain plan made for a single index dobby is given at Fig. 7 for a right hand loom and for a left hand loom at Fig. 8. Only one repeat is given but two would have to be made as six bars will not pass around the chain barrel.

There are other methods of giving instructions for building chains but in any case it is wise to use one system and stick to it; don't keep changing around. Sometimes a fixer builds his own chains and in many cases he will build them all alike, that is for one hand loom and then on a right hand loom will start the pattern with the first bar in the chain, but on a left hand loom will start the pattern with the last bar in the chain. The writer, however, prefers the method given, as it is uniform, and all patterns will certainly be alike.

The Bureau of Foreign and Domestic Commerce is in receipt of a communication from a foreign business house stating that it is in constant touch with large East Indian export houses which buy enormous quantities of cheap cotton goods. This firm is anxious to get in touch with American manufacturers who are willing to prepare cotton goods to meet the requirements of that market. The firm in question is prepared to supply the necessary samples to such manufacturers to give them a complete line and understanding of what is wanted. The goods especially wanted are lines of cheap handkerchiefs, calicoes, printed goods and underwear, all in the cheapest lines. This firm states that it is in a position to do a good business in these lines if they can be supplied at the right prices. Refer to file No. 12835.

DESIGNS FOR FANCY COTTON FABRICS.

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART THIRTEEN.

Fig. 52 illustrates a striped cloth which is made in various colors and used as curtains. The broad stripe is woven with the 2/2 twill to left, and the narrow stripe with the 5/1 twill to right. The design is illustrated at X in Fig. 53 while the draft and weaving plan appear at Y and Z. Since one weave is complete on 4 picks, and the other on 6, it is evident that there will be 12 picks to the round as shown. The 2/2 twill part contains 38 threads on the basis of 40

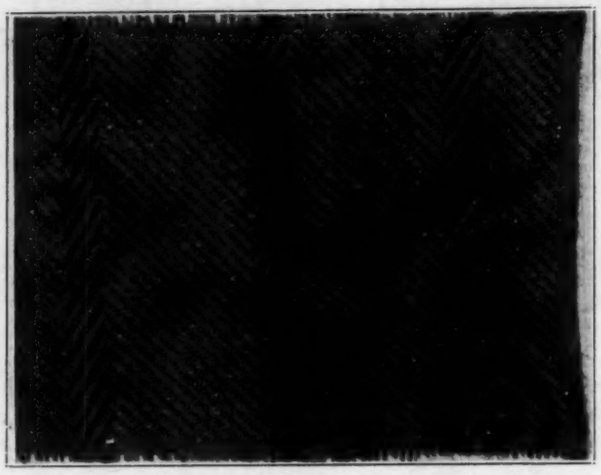


FIG. 52.

threads per inch, and is reeded 2 threads per split, whereas the 5/1 twill part contains 15 threads on the basis of 60 threads per inch, and is reeded 3 threads per split. The number of splits per inch of the reed will again be a constant number, but the two methods of reeding results in the

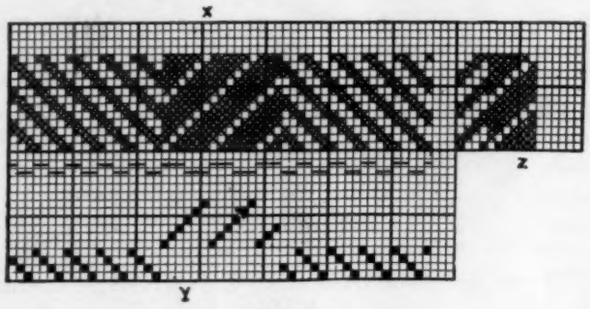


FIG. 53.

formation of different angles in the two stripes, and at the same time makes the narrow stripe a prominent feature of the fabric.

The three cloths shown respectively at A, B and C in Fig. 54 are introduced to illustrate another method of forming stripes, and, although largely employed in this respect, the method is due more to a printing process than to a weaving process. At the same time the printing in this case is done on a fancy twilled fabric, the weave of which is shown at D in Fig. 55, and, since the draft is straight over the harnesses, and no two threads of the design are the same, it follows that the design is also the weaving plan.

Printing on fabrics is practiced to imitate weaving effects as much as possible, and in some cases the effects produced by the printing process could be obtained in weaving only by complicated structures, and hence expensive fabrics. The first pattern A, Fig. 54, shows clearly the weave, and although the cloth would be woven with white yarns, this

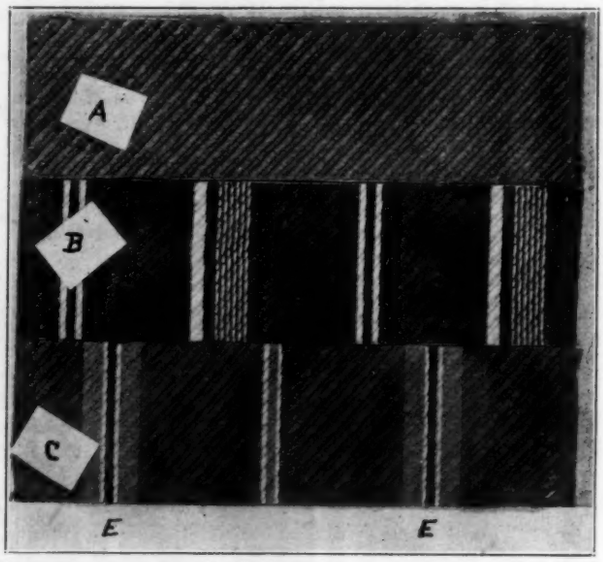


FIG. 54.

particular sample is a golden yellow color, and will probably have been dyed to this shade. A printed effect could be obtained on cloth A, but there would probably be no white stripe in it. In B and C, however, there are white stripes which present uninterrupted solid lines, and similarly, the stripes of green, purple, and heliotrope, which are present in these fabrics, are solid color effects from end to end of the cloth. Two or more solid effects in the same fabric are practically impossible to obtain by weaving unless the cloth is two or more ply in thickness, or the warp

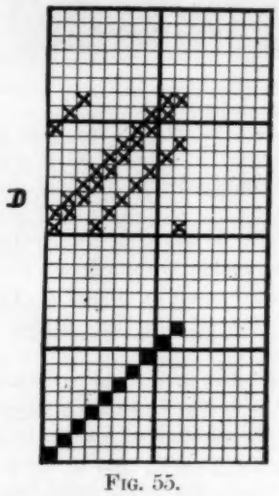


FIG. 55.

threads be set so closely that the weft cannot be seen. In ordinary single cloths, such as those illustrated in Figs. 54 and 55, the effect cannot be obtained by weaving alone. A sufficiently close approximation to the general character of the stripes may, however, be obtained by introducing the proper color of threads to form the stripes. Thus in cloth

B the narrow stripes of 7, 4 and 2 threads respectively are all white upon a dark green ground. By placing a suitable number of white threads at these places, and particularly by cramming the reed and using more threads, the white stripes would form a decent imitation of those in fabric B, but the continuity of these white stripes would be more or less broken by the green weft which is essential for the solid green portions. Three colors appear in pattern C, Fig. 54, and if it were intended to weave this pattern, the nearest approach to it, without cramming the reed, would result from the undermentioned order of warping:—

Purple	32	5	64	64	5	32	= 202
Heliotrope	10	10	5	10	10		= 45
White	3 3	3 3	3 3				= 18
							265

Fig. 56 illustrates another collection of printed fabrics. Here again the cloths will have been woven white, or else

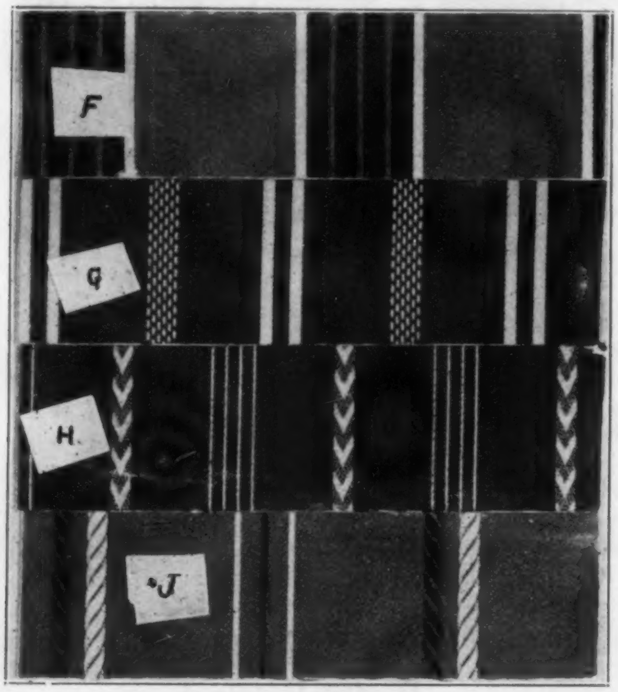


FIG. 56.

woven grey and then bleached white, and afterwards the dark stripes or figures introduced by a printing process. The cloth itself is made with the 5-thread sateen illustrated at K, Fig. 57. If the straight draft were used the weaving plan would naturally be the same as the design or weave. All these patterns could be reproduced in weaving more effectively than could those at B and C, Fig. 54, for the simple reason that the weft need not appear on the surface as much.

The twilled spot effect in G could be obtained by a weave somewhat similar to that at L, Fig. 57, although this weave would necessitate the addition of 5 extra harnesses. The effect might also be approximated too by using the 2/2 basket or 3/3 basket, in which case only 2 extra harnesses would be required, but the weaving plan would clearly be extended in the way of the weft.

The arrow-head or herring-bone stripe in pattern H could be elegantly reproduced by either of the weaves M or N, Fig. 57, while the black and white twills in cloth J might be made from the design O for the white thread twilling to the right, and the same weave twilling to the left for the black threads.

The warping particulars for the cloths, which contain

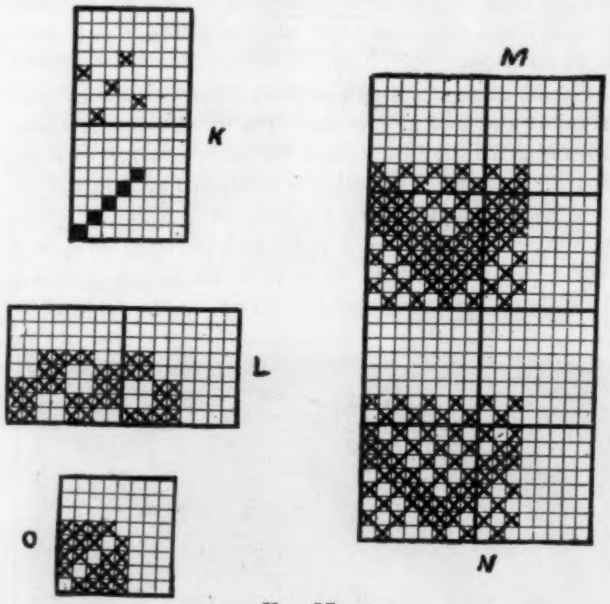


FIG. 57.

80 threads per inch and 112 picks per inch might be as follows:

Cloth F

Green	75	3	3	3		= 84
White	5				5	= 10
Black	10	10	10	10		= 40

Threads per repeat 134

Cloth G

White	7	12	7		= 26
Black	4	40	40	3	= 87

Threads per repeat 113

Cloth H

Black	2	4	35	35	4	2	= 82
White	2	2	10	2	2		= 18

Threads per repeat 100

Cloth J

Green	8	60	5	60	8	= 141
White	3	10	3			= 16
Black	2	10	1			= 13

Threads per repeat 170

(*To Be Continued.*)

Consul General Olney Arnold, of Cairo, notes the development of a fine new variety of Egyptian cotton, which has been named Pangalo, having been produced by careful selection on Mr. Pangalo's estate at Mit Ghamr. Mr. Arnold adds that this new cotton, which is brown and of a most silky texture, has a staple which is probably stronger than any of the other varieties of Egyptian cotton. One of the most characteristic features of the plant is its shortness, and the fact that it is covered with bolls, over 100 having been found on a single plant.

SOME POINTS ON SLASHERS.

BY H. D. MARTIN.

As a great deal of bad work can be made in a very short time on the slashers, it is important to have these machines in perfect working order. Taking good care of slashers amply repays every consideration given to them. Work spoiled there is almost beyond repair or of no use. Even when slashers are in good working order, careless handling by attendants is sure to make much waste material. Following is a list of bad work that can be made by a careless slasher tender, even when the slasher has no mechanical defects:

1. Over sized or hard warps.
2. Under sized or soft warps.
3. Hard sized places in spots on a warp.
4. Irregular sizing, one warp soft, another hard, etc.
5. Warps over filled.
6. Warps without cut marks.
7. Cut marks of wrong length.
8. Cuts too long or too short.
9. Crossed ends.
10. Ends left out.
11. Too many ends.
12. Pattern picked and layed wrong.
13. Warps made without taking sufficient leasings at the back to straighten the ends.
14. Warps wound on the beam too hard.
15. Warps wound on the beam too soft.
16. Stretching the yarn too much between head end and cylinders or cylinder and section beam rack, or both.
17. Yarn cut by compression roll at each end of the loom beams.
18. Mixed yarn.
19. Mixed colors.
20. Warp too large or too small at one end.
21. Too many warp pieces caused by smashes.
22. Too many smashes in full warps.
23. Bad selvedges.
24. Broken beam heads.
25. Dirty size used.
26. Other dirt allowed to drop into yarn as warps are being made.
27. Warp not started right, that is, not fastened to beam barrel, causing the warp yarn to turn on the beam barrel.
28. Waste of yarns.
29. Waste of size material.
30. Waste of other supplies.
31. Abuse of machine causing excessive wear and tear.
32. Making warps not wanted on orders.
33. Running short of warps on order.
34. Sizing on warps not dried perfectly.

There may be other defects, but here is a list of over thirty troubles which can be caused by a poor slasher man, even when operating good machines. Every one of these defects may cause any amount of trouble to a large number of good weavers. Therefore, the thoughtful reader of this article, be he manufacturer in any capacity, whether as owner, agent, superintendent, overseer, second hand or a slasher tender himself, can well pause and consider well the workings of his slashers. He can see that it pays to have first class slasher tenders, who will see that none of the defects listed are caused to injure the work of the weaving department. The man needs to be trained, as well as to have the machine watched and kept in the very best of working order.

One good way to follow down the defective work made at the slashers, is, to keep a record or a running account against each machine. This can be done by using the accompanying form, Fig. 1. From this form, daily reports can be turned over to the slasher tenders.

Another interesting report form which is very helpful in connection with the performance of slashers is shown by Fig. 2. By this report, is shown the precise condition of things with reference to the warps on each line of goods. It shows the warps run out and entered into the looms for the day. It also states those that are estimated to run out the following day; the warps on hand to meet the demand; and the standard which the management designates as a safe amount to carry in stock ahead and on the floor. It also shows the warps short of or over the standard authorized. The authorized standard prevents making a large amount of warps not wanted on orders.

Thus far, our paper has dealt only with such defects as can be caused by inattention to business with slashers which were capable of making perfect warps. Now we come to slashers which may be neglected and grossly defective, and

MILL NO._____ WARP DEFECTS

DEFECT FOUND ON DATE	NAME OF GOODS	ORDER NO	SET NO	WARP NO	DATE SLASHED	SLASHED BY	NATURE OF DAMAGE

FIG. 1.

MILL NO._____ WARP REPORT DATE_____

NAME OF GOODS	RUN OUT	LOOMED	COMING OUT TOMORROW	ON HAND	STANDARD WANTED	SHORT	OVER	TO BE MADE	REMARKS

FIG. 2

on which it is unfair and impossible to ask or expect even good help to make good work. It may seem strange in these days of high efficiency and expert engineering forces that any class of machinery should be allowed to run down, get out of order, or be operated under imperfect conditions. However this may be, here is a list of defects which were found on slashers being operated in one of the mills of New England, by an expert mill mechanic or engineer:

1. Not using size material best adapted for goods dressed.
2. Size material poorly made.
3. Friction discs worn too much for good work.
4. Machines improperly geared to give the yarn the proper drag.
5. Making excessive waste.
6. Piping imperfectly arranged which allowed hot water to enter the size feeding pipe at the size kettles.
7. Everything about the slashers was so dirty that it dropped into the yarn causing dirty and lumpy warps.
8. Front roll driving gear, having teeth out and skipping.
9. Front roll too small to grip the yarn well and draw uniformly.
10. Heat allowed to be wasted which should have been

utilized to dry the size on the warps, especially as they were running very slowly so as to dry them properly.

11. Fans running too slow.

12. Some fans stopped entirely.

13. Size made too thick.

14. Copper squeeze rolls very rough and needed turning down to smooth the surface.

15. Size feed pipes had to be unplugged every morning.

16. Size tank leaked.

17. Toping boards missing when they should have been employed.

18. Loom beams were warped out of shape.

19. Presser bars not in use, causing ends to roll in front of slasher.

20. Dangerous places exposed.

21. Copper drums bulged out of shape.

Is it not to be wondered that slashers operated under these defective conditions could make work that would run at all?

In another New England plant a new management made the following improvements on the slashers: double cut washers were put on; also compression traverse rolls; a continuous running water pipe applied to all slashers; brass size material pipes put in to replace the old iron ones; all machines levelled; old reeds replaced with new ones; warp beams slotted to hold the yarn at the start of warp; weights that were used on the friction bands of the section beams at the back of slashers were all made uniform; all hoods were painted white; and better electric lamps installed to give abundant light.

In one of the leading Southern mills the slashers were found to be quite defective; steam leaks were stopped at several points; bearings were badly worn; front roll necks were worn and cut; the wraith was practically useless; and the size kettle was inadequate to give the proper supply of size.

Conditions such as related are sometimes found in what is supposed to be among the best managed of mills. Generally speaking, there is a great deal of danger of making too much waste at the slashers, at both the front and back of the machines. There is also danger in not having the warps sized uniformly. Another difficulty is under-production.

The best results can be obtained from slashers by keeping a careful record of operations. Some mills do this and know exactly how much waste is being made, why made, whether hard or soft, *i e.*, sized or unsized waste. They also know the exact net amount of yarn put through the machines and the net weight of the warps slashed. From these figures a running account is kept of the slasher operations. Such mills know the exact percentage of size applied and the production complete, together with the costs of operating. The mills doing this find that such a system pays, and they have the best and most even running work, while mills without this method never know exactly the status of slasher performances. All attention which can be given the slashers by the thoughtful people concerned, will be well repaid in much better and more even running work.

Don't be afraid of failure. Keep on, though you fail a dozen times.

Don't be afraid to admit when you are in the wrong.

CLOTH ROOM METHODS AND MACHINES.

BY C. F. FALLIN.

To resume our discussion on the daily report, Fig. 7, after having ascertained the yarn required to make the cloth desired, see to it that the carder and spinner keep the yarn and roving numbers to this required standard.

On the left of the report, Fig. 7, is the columns beyond the style and pattern number marked yards received and pounds received. No doubt I should have dealt with these features first as they are the first to appear on the report blank, but unfortunately I overlooked them until now, as I also overlooked making a diagram for permanent record for this part of this report.

At the present time I know of no mill that does not weigh its cloth as it comes from the weave room and give it more or less importance in the mill records. A good many mills, perhaps a majority, use these weights as the basis for production calculations, and while I do not believe that this is the proper place to ascertain production, yet I do not intend to present at this time my idea of how to figure accurate and real production. I shall go into this matter a little later on.

As the goods come into the cloth room from the weave room a competent and accurate man separates and weighs each style to itself, setting down under its respective style and pattern number the pounds, and sometimes the pieces he receives. Once each day, when all the cloth is in from the weave room, the overseer or bookkeeper takes one of the previous daily reports and by using the last actual average weight for this particular style and multiplying the pounds received from the weave room by this figure, a fairly accurate estimate of the yards received, as well as the pounds received, may be obtained. This information is usually recorded on a blank form something like the one shown in Fig. 8. These blank forms should be prepared for filing in a loose leaf binder, as I believe every one of the forms shown in this series should be. It may, however, be printed on large loose sheets and kept on a convenient board until the end of the production period and then destroyed, but I do not believe in destroying any record which may in the future be needed for reference.

Another use to which this form Fig. 8 may be put is that some loose ones may be tacked to a suitable board and used by the cloth weigher, of course ignoring the date column. Then, when the cloth for the day is in, the overseer has only to foot up the columns and he has his posting for the permanent record under the proper date and as the cloth weigher has copied the exact order of style numbers as shown at the top of this form many possibilities for errors in posting are obviated.

These forms should be made of sufficient width and contain a suitable number of style columns to accommodate all styles being made, all that may run out, and all new ones that may start on looms during the production period it is supposed to cover. Do not be afraid of getting the form too wide. At the extreme right on this form, Fig. 8, is a column marked totals. Into this column post the totals as shown in corresponding columns on the daily report, Fig. 7. At the end of the production period, add each column separately from top down and then the totals at bottom from left to right and a perfect check may be had on work. In the next chapter we will take up the monthly report.

RECEIVING RECORD.
BLANK COTTON MANUFACTURING CO.

DATE	STYLE-PATTERN		STYLE-PATTERN		STYLE-PATTERN		STYLE-PATTERN		STYLE-PATTERN		TOTALS	
	YARDS	POUNDS	YARDS	POUNDS	YARDS	POUNDS	YARDS	POUNDS	YARDS	POUNDS	YARDS	POUNDS
TOTALS												

Fig. 8. The Receiving Record.

RECENT IMPROVEMENTS IN ENGLISH LOOMS.

BY FRED W. HORROCKS.

A few years ago, during one of the periodic spells of bad trade, manufacturers in Lancashire became aware of the fact that some things were better in the "States," and the "Americanizing" of our sheds was begun. Buildings were built on "the American plan," knotters were introduced into the winding room, twisting machines were brought in, Northrop looms showed what ought to be done, while warehouse and office routine, and the advertising departments have been speeded up so that anyone without a knowledge of shorthand, typewriting, and a few languages is classed "no good."

The advent of the Northrop loom caused a tremendous commotion throughout the industry, and owners of antiquated looms, which had for generations been jogging along in a self-satisfied manner at 120 picks per minute, put on new pulleys in order to compete on more level terms with foreign competition and especially the Northrop loom.

Speed and production are, however, not always synonymous terms, and something more than a little pulley is required to increase production from an old loom. Lately, most of the Lancashire loom makers have made attempts to produce and introduce various types of automatic looms, but the manufacturer and the operative alike still prefer the ordinary type of loom, and many of the automatic samples have been scrapped. At the present time, manufacturers seem to be engaged in making the utmost use of the machinery they have, but fresh orders are generally for looms provided with one or more improvements.

The weft fork, said by some to have been invented by a man named Osbaldeston, and by others, a former member of the firm of Howard & Bullough, is said to have been arranged with the bristles of a brush acting as the prongs of the fork. Until quite recently, very little thought was given to the construction of the weft fork and grate, but in the case of Pickles' "Tandemite" fork, the breakage of the weft by the fork is an impossibility. This weft fork is in two parts, the front or prong portion having only to perform the delicate function of feeding for the weft, the back portion or hook being pulled by the hammer when the weft is missing, in order to stop the loom.

The ordinary type of weft fork and grid acts upon the weft somewhat like a pair of scissors, and when the back part happens to be too heavy for the quality or counts of weft used, the front portion has to go through the grid some distance in order to raise the hook. By means of what is called a "glove" on each fork prong the weft is treated most carefully. This glove, which is simply a rubber tube, prevents the weft from being cut or chafed by the fork grate. When a fork of this description with the glove attachment is used, the fork scarcely needs to go through the grate, as the weft cannot slip round the prongs but immediately raises the hook.

The fork grate in the Pickles' loom has also received attention, the vertical bars being of catgut or other suitable material of similar properties, so as to render them somewhat flexible. When a fork grate on this principle is used in conjunction with a gloved weft fork, it is obvious that breakages of weft with the consequent loss of time, and inferior production, will be reduced to a minimum.

Flexible reeds are in use in some sheds. These are reeds in which the dents in the bottom rib or baulk are wrapped with dry band, the dents in the top baulk being wrapped with pitch band as in the old style. This arrangement permits lumps, knots, etc., to pass through much more readily than in the case of the ordinary rigid reed, as the dents open out in the bottom baulks when an obstruction is met with, and then spring back.

Wire healds have now obtained a firm footing in many manufactories in Lancashire, especially in the weaving of heavy goods, such as fustians, velveteens, terry or Turkish towels, etc. These healds are much more durable than worsted, cotton, or other healds from fiber; and are smooth and sufficiently flexible as to be suitable for any counts of yarn, except the finest.

Self-threading shuttles are slowly coming into favor. Weavers in Lancashire are very slow in their appreciation of new methods, and though public opinion is in favor of the abolition of the old type of shuttle, as it is considered

dangerous to health, the weaver is apt to magnify the faults of the self-threading shuttle, and no shuttle has been introduced yet without faults.

Patent compressed shuttles have been introduced by one firm of shuttle makers. The best wood for shuttles is boxwood, as it is smooth and close grained. By means of very powerful hydraulic presses, other woods such as persimmon, can be compressed to the exact weight of boxwood, and are claimed to be equally free from liability to chip or split. These compressed wood shuttles, however, are of no use in humidified sheds, as they are apt to swell out on account of the moisture.

Loom brakes are now considered more than formerly. When the loom is provided with a brake that stops the loom as it should, that is, with the shuttle at the setting on side and the cranks at the back position, the weaver's work is considerably reduced. Some brakes need very frequent alteration, owing to wear, dirt, oil, etc., but some are quite positive in their action, and never fail to stop the loom as it should be stopped.

KNITTING DEPARTMENT.

DESIGNING ON THE CIRCULAR FRAME.

BY WILLIAM DAVIS, M. A.

PLAIN PRESSER WHEELS.

The 1 and 1 presser and its possibilities of designing has already been dealt with and it will be interesting to extend the investigation a little further, so as to include 2 and 2 and 3 and 3 presser wheels, and other elementary varieties. The scheme of variation adopted for the 1 and 1 presser can be employed with equally effective results in the case of 2 and 2 or 3 and 3 wheels. A view of the 2 and 2 presser is shown in Fig. 3 where the teeth are cut in alternate two's, the small notches pressing the needles and the large notches leaving them unpressed. The wheel is shown to be working on a few of the needles, those marked 1 and 2, 5 and 6 and so on are pressed and knit their stitches, whilst needles 3 and 4, 7 and 8, etc., are left unpressed and so tuck their stitches.

The first designs to be noted are those which can be used with the needles in the frame exactly divisible by 4, and the intervening plain presser will be found very useful in clear-

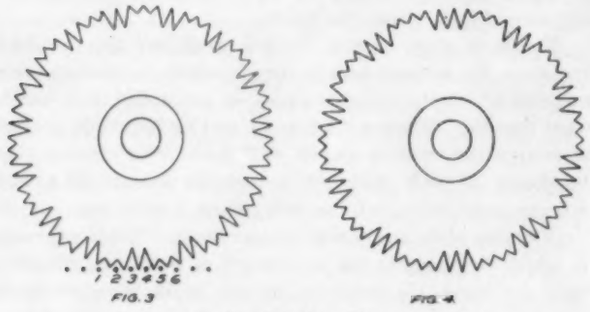


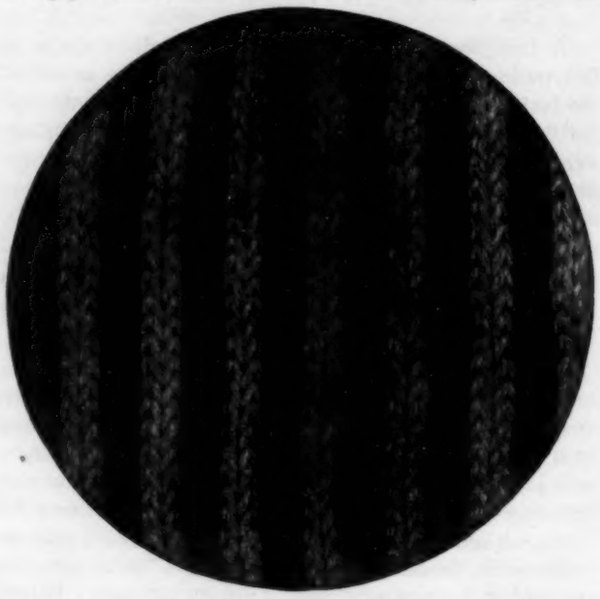
Fig. 3. The 2 and 2 Presser.
Fig. 4. A 3 and 3 Presser.

ing the needles of the tucked loops. Design 9 is produced on a 2-feed machine where the presser wheel of Fig. 3 is used in one feed, and the plain presser for the second feed. Illustration M shows a pattern of cloth produced by this arrangement where white yarn is used on the one feed and dark colored thread on the other. The result is a vertical stripe showing 2 vertical rows of stitches white, and 2 vertical rows of dark color. On examining the back of the fabric it is seen that the white has the dark colors tucked beneath it, whilst the dark color has the white tucked beneath.

In the case of the stripe the effect shows perfectly clear, the white does not interfere on the dark portions, and the dark color does not interfere on the white portions, as is the case when patterns more complicated are worked on this machine.

Illustration N shows a fabric made similarly with the aid of a 1 and 1 presser on a 2-feed frame, colored 1 dark, 1 white. Because of the tucking of the yarn on the back of the cloth, a fabric is produced much thicker and more solid than the ordinary plain stitch and the use of the cloth so made obtains a much wider field.

Design 10 can be produced by the same presser wheel being placed on each feed of a 2-feed machine, one is made



Fabric M. 2 and 2 Tuck.

to tuck needles 1, 2, 5, 6, etc., whilst the other tucks needles 3, 4, 7, 8, etc. In design 11 a four-feed frame is used with feeds 1 and 3 having the 2 and 2 presser arranged as just stated, whilst feeds 2 and 4 have plain presser wheels. Design 12 is also made on the four feed, feeds 1 and 2 having their pressers arranged to press and tuck exactly the same needles, whilst in feeds 3 and 4, the pressers tuck and press the needles alternately from those just mentioned.

Design 13 could be worked on a 3-feed machine having the pressers of feeds 1 and 2 set the same and that of feed 3 set to work on the alternate pairs. Design 14 shows an attempt to have a tuck pattern extending over three courses, whilst on the fourth, all the stitches are pressed over, the pattern being obtainable on a 4-feed machine. The success or otherwise of the tuck of 3 would depend somewhat on the

thickness of the yarn employed and its relation to the gauge of the frame.

Some of the designs referred to can be produced on a smaller number of feeds, if the needles of the machine contain needles to satisfy certain conditions. In the case of the 2 and 2 presser, it would be useful to have the number of needles such that they can be divided by 2 but not by 4, in other words, the number should be such that when the number 4 is divided into it, there should be 2 remainder. Thus if there are 60 teeth in the presser wheel as given at Fig. 3, then the number of needles in the frame would require to be such that 4 would divide into it and leave two over, or that the number of the teeth in the presser wheel, 60, will divide into the number of needles in the frame and always have 2 over. Expressed in a formula it will appear as follows: Let N represent the number of needles in the frame and P the number of teeth in the presser wheel, then, N equals P X plus or minus 2. X represents the number of times that the teeth in the presser wheel divide into the needles in the frame and for normally built machines, this would not be

FABRIC N. 1 AND 1 TUCK ON A 2-FEED FRAME.

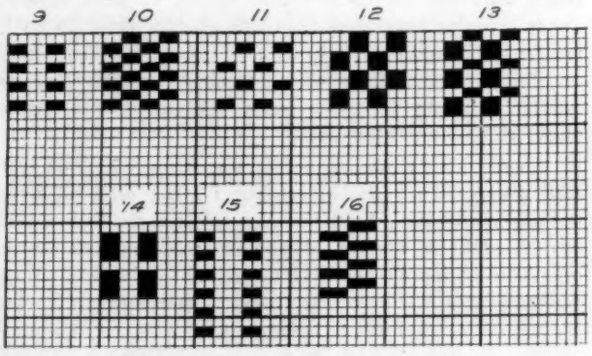
less than 3 or 4. Suppose X be taken as 4 and P, the number of teeth in the presser wheel, as 60, then the number of needles N in the frame would be given by: N = (60 × 4) plus or minus 2 = 240 plus or minus 2 = 242 or 238.

If X, the number of repeats to be taken as 6 for a finer frame and the number of teeth in the presser wheel be increased to 72, then the number of needles in the frame is given: PX plus or minus 2. N = 72 (6) plus or minus 2. N = 432 plus or minus 2 = 434 or 430 needles.

By having the needles in the frame in this ratio, designs such as 10, 11 and 12 could be made on frames with fewer feeds than previously mentioned. Design 10 could be worked on a single feed, design 11 on a 2-feed frame and design 12 on a 2-feed. This principle can also be applied to the 1 and 1 presser where the needles in the machine are of an odd number, or according to the formula N = PX plus or minus 1 where P, the number of teeth in the presser, must always be an even number.

Designs 15 and 16 are produced by the 3 and 3 tuck presser shown at Fig. 4 and it will be seen that the wheel is cut in alternate 3's, 3 small notches and 3 large notches which leave their needles unpressed. To produce those patterns on a minimum of feeds, the number of needles in the machine will require to be divisible by 3 and have 3 more or 3 less as remainder. Or taking the formula N = PX plus or minus 3. If X = 7 and P = 60 then the number of needles in the frame is given by: N = PX plus or minus 3. N = 60 (7) plus or minus 3. N = 420 plus or minus 3 = 417 or 423. The frame would require to have 417 or 423 needles to meet the required conditions.

It must, however, occur to the reader that frames cannot be adjusted to suit the size of the presser wheel and that more frequently the problem will be to find a suitable size of presser wheel to meet the circumstances. In the case of simple patterns, the usual size is that from 56 to 64 teeth to suit the repeat of the pattern. Obviously the pattern must repeat exactly on the presser wheel. The number chosen is such that the resultant wheel is of a size convenient for placing on the frame. A wheel, say of 96 teeth, would produce too great a circumference and be difficult to accommodate. At the same time, if an assortment of dif-



DESIGNS.

ferent gauges of machines are in stock, it is important to have a note of the total number of needles in each with a view to making various patterns on the lowest number of feeds possible,

Let some examples of the above formula be taken, where the number of teeth in the presser is varied, and a 4 and 4 presser used. Suppose the number of teeth in the presser wheel be 48 and X, the repeat number, be 8, then N = PX plus or minus 4. N = 48 (8) plus or minus 4 = 384 plus or minus 4 = 388 or 380 needles in the frame.

If the number of teeth in the presser be increased to 64 and X, the number of repeats, be taken as 10, then for the 4 and 4 presser N = PX plus or minus 4. N = 64 (10) plus or minus 4 = 640 plus or minus 4 = 644 or 636 needles in the frame.

(To Be Continued.)

One of the largest wholesale dry goods houses in a foreign country informs an American consulate that it desires to be put in communication with American manufacturers of plain cotton piece goods. The firm requests lowest cash prices, preferably c. i. f. certain cities, and asks that samples be submitted also. For further information write the Bureau of Foreign and Domestic Commerce and refer to file No. 13061.

Don't be afraid to play the game honestly. Honesty always wins out.

Dyeing, Bleaching and Finishing.

THE MANUFACTURE OF ARTIFICIAL SILK FROM COTTON.

BY H. R. CARTER.

(All rights reserved.)

APPENDIX.

The following items of information about the chemicals used by manufacturers of artificial silk may be found useful:

Caustic Soda (*Sodium Hydroxide*) in its commercial state is a white fused mass. When opening a cask, or drum, it must not be forgotten that caustic soda has a great attraction for water and carbon dioxide and as this latter gas converts the caustic soda into carbonate of soda (soda ash) the barrel or drum, should be kept covered. Trade samples have been found to contain from 75 to 97 per cent of actual sodium hydroxide, the balance being made up of such impurities as sodium carbonate, sodium chloride, sodium sulphate (Glauber salt), sodium silicate (water glass) and sodium aluminate.

A caustic soda solution having a specific gravity of 1.014 (2.8 degrees Tw.) should contain 1.2 per cent of actual sodium hydroxide. A 10 per cent solution shows a specific gravity of 1.115, while a solution showing a specific gravity of 1.53 contains 49 per cent of sodium hydroxide. When purchasing caustic soda, the strength (percentage of actual sodium hydroxide) should be specified. Caustic soda of 77 to 78 per cent strength is a commercial article. Caustic liquor standing at 70 degrees Tw. may also be had.

Caustic soda is produced by the Castner-Kenner process, from salt in solution at Runcorn in Cheshire. This is an electric process, the current at 3 volts pressure enters the salt and evolves chlorine, which escapes. It then enters mercury, where it deposits metallic sodium, which is then dissolved out in water, forming a pure solution of caustic soda.

Caustaic Potash, Potash, Potassium Hydrate, or *Potassium Hydroxide,* formula K O H, is very powerful caustic, very similar in properties to caustic soda. It is prepared for practical purposes by a process similar to the Le Blanc soda process and is formed by the action of potassium on water. The potassium is obtained from potassium chloride, which occurs in enormous quantities at Stasfurt. This yields potassium carbonate from the latter, by its interaction with slaked lime (solutions of the two being boiled), caustic potash is obtained, being usually cast in the form of sticks.

Commercial Sulphuric Acid or *Vitriol* H2 SO4 can be bought of any required strength. Concentrated and chemically pure it should be of 92 per cent strength, specific gravity 1.84, testing 66 degrees Be. 168 degrees Tw. It only needs diluting to be ready for use. In mixing it with water it must be *added to* the water and it is important to agitate the liquids to a considerable extent so as to insure their absolute intermingling.

Rectified Oil of Vitriol O V or *D O V i.e.* double O V may be had. A carboy of vitriol weighs about 180 pounds.

The actual process of the manufacture of sulphuric acid is somewhat complicated. The essential principle is that sulphur dioxide is obtained by burning iron pyrites and that by means of nitric acid fumes, the dioxide is further oxidised into the trioxide, the oxides of nitrogen in the fumes acting as oxygen carriers. When the pure acid is finally obtained it is found to be a thick, colorless, heavy liquid, which has an extraordinary affinity for water, so much so that it is practically impossible to obtain sulphuric acid that is entirely free from water.

Sulphuric acid absorbs water from the air with great avidity and should therefore be kept in closed vessels. On mixing with water it evolves great heat. In order to avoid dangerous boiling up and spattering, sulphuric acid should always be diluted by being poured in a thin stream into a large quantity of cold water, stirring well all the time. The water must not be warm, and on no account should water be poured into strong acid. Sulphuric acid diluted with half its weight of water does not give off great heat on being further diluted.

The strength of sulphuric acid may be determined with the hydrometer, according to the following table:

SPECIFIC GRAVITY OF SULPHURIC ACID AT 59 DEGREES F. (LUNGE AND ISLER)

Degrees Twaddle	Percentage Sulphuric Acid	Degrees Twaddle	Percentage Sulphuric Acid	Degrees Twaddle	Percentage Sulphuric Acid	Degrees Twaddle	Percentage Sulphuric Acid
2	1.57	48	32.28	94	56.90	140	77.17
4	3.08	50	33.43	96	57.83	142	78.04
6	4.49	52	34.57	98	58.74	144	78.92
8	5.96	54	35.71	100	59.70	146	79.80
10	7.37	56	36.87	102	60.65	148	80.68
12	8.77	58	38.03	104	61.59	150	81.56
14	10.19	60	39.19	106	62.53	152	82.44
16	10.90	62	45.35	108	63.43	154	83.32
18	12.99	64	41.50	110	64.26	156	84.50
20	14.35	66	42.66	112	65.08	158	85.70
22	15.71	68	43.74	114	65.91	160	86.90
24	17.01	70	44.82	116	66.71	162	88.30
26	18.31	72	45.88	118	67.59	164	90.05
28	19.61	74	46.94	120	68.51	165	91.00
30	20.91	76	48.	122	69.43	166	92.10
32	22.19	78	49.06	124	70.32	167	93.43
34	23.47	80	50.11	126	71.16	168	95.60
36	24.76	82	51.15	128	71.99	168.3	97.70
38	26.04	84	52.15	130	72.82	168.1	98.70
40	27.32	86	53.11	132	73.64	167.7	99.95
42	28.58	88	54.07	134	74.51		
44	29.84	90	55.03	136	75.42		
46	31.11	92	55.97	138	76.30		

N. B. Sulphuric Acid of 97.7 per cent has the highest sp. gr., stronger acid is a little lower.

Hydrochloric or Muriatic Acid, HCL, is also a commercial article frequently used in preparing the cellulose for solution. Concentrated and chemically pure it should be of 40 per cent strength, specific gravity 1.20, testing 24 degrees Be = 40 degrees Tw. It is particularly valuable as a sour after chemicing, for any lime which may be left is quickly neutralized or killed by hydrochloric acid. Hydrochloric acid on the other hand must not be used as a finishing sour, as it gives a slightly yellowish tinge. A carboy weighs about 112 pounds. Hydrochloric acid may be prepared by the action of sulphuric acid on common salt, the hydrochloric acid being given off as a gas, which is absorbed in water. It is largely made as a preliminary to the making of washing soda. As regards the specific gravity of hydrochloric acid at 59 degrees it is noticeable that each degree Twaddle indicates approximately 1 per cent hydrochloric acid.

Acetic Acid. Commercial acetic acid is a colorless liquid

usually containing 30 to 50 per cent pure acetic acid. It contains from its preparation traces of mineral acids in addition to water or it may be adulterated intentionally by mineral acids. An admixture of the latter is liable to be especially injurious in acetic acid used for scrooping artificial silk and may affect the silk in storage. Therefore only acetic acid warranted free from mineral acids should be used. The hydrometer is not satisfactory for an exact determination of the strength of acetic acid, but it is frequently employed in order to approximately estimate its strength. Acetic acid may be prepared by the destructive distillation of wood, but it is more usually prepared from crude sodium acetate. For this purpose the sodium acetate is acted on with either hydrochloric or sulphuric acids. For 100 pounds of calcium acetate 115 pounds of hydrochloric acid of 20 degrees Be., is required. The two are thoroughly stirred up and allowed to stand, when the small quantity of tar contained in the acetate of lime rises to the surface and is skimmed off. The liquor is then heated in copper boilers by means of steam coils and the acetic acid vapors are driven off and condensed.

Theoretically, 100 parts of the crude grey acetate of lime, containing 82 per cent of the pure substance, should yield 60 parts of glacial acetic acid; but this yield is never obtained in practice, as a certain amount of acetic acid is held back by the chloride of calcium liquor remaining in the boiler. Acetic acid prepared in this way is usually of about 45 per cent strength and as such is brought into the market, but can be concentrated by rectification.

Nowadays, the tendency is to use sulphuric acid instead of hydrochloric acid for liberating acetic acid. It will be seen that where as the liquor in the boiler remains fluid when using hydrochloric acid, this is not the case when working with sulphuric acid as insoluble calcium sulphate is formed in the reaction. Further, when using sulphuric acid certain other decompositions take place simultaneously, with the result that some sulphur dioxide is formed and the acid is not so pure as that obtained by the hydrochloric acid process. The sulphuric acid process has, however, this great advantage, that as the liquor is not diluted, the acetic acid is obtained in a more highly concentrated state—that is, as high as 75 degrees.

The most concentrated acetic acid is called glacial acetic acid, so called on account of its property of solidifying to a hard, ice like mass in moderately cold weather.

Acetic acid for "scrooping" artificial silk, should be water clear and should not decolorise a solution of potassium permanganate

Ammonia. Commercial ammonia or ammonia liquor is the colorless aqueous solution of gaseous ammonia and is distinguished by its very pungent smell. It has a specific gravity of about 0.92 and is consequently lighter than water. The gaseous ammonia is expelled from the solution by heat and will even evaporate naturally if the solution is left unprotected. Ammonia has very strong alkaline properties and turns red litmus blue, it neutralizes all acids, combining with them to form salts. It is used in the manufacture of artificial silk by the cupra-ammonia process. The strength of ammonia is usually estimated with the hydrometer, for which purpose the following table may be used:

SPECIFIC GRAVITY OF AMMONIA LIQUOR AT 59 DEGREES F.
(LUNGE AND WIERNIK)

Specific Gravity at 59° F.	Per Cent Gaseous Ammonia.	Specific Gravity at 59° F.	Per Cent Gaseous Ammonia.	Specific Gravity at 59° F.	Per Cent Gaseous Ammonia.
1.000	0.00	0.960	9.91	0.920	21.75
0.995	1.15	0.955	11.34	0.915	23.35
0.990	2.31	0.950	12.74	0.910	24.99
0.985	3.55	0.945	14.22	0.905	26.65
0.980	4.80	0.940	15.63	0.900	28.33
0.975	6.05	0.935	17.12	0.895	30.03
0.970	7.31	0.930	18.64	0.890	31.75
0.965	8.59	0.925	20.18	0.885	33.68

The most common method of preparing ammonia is by double decomposition. Salammoniac being heated with quicklime, with the formation of calcium chloride which is very soluble in water, whilst ammonia gas is liberated. The following equation represents the reaction:

$$2\,N\,H_4\,Cl + CaO = Ca\,Cl_2 + H_2\,O + 2\,N\,H_3.$$

Absolute or Pure Alcohol is a colorless liquid of a pleasant smell and acid burning taste with a specific gravity of 0.794. In commerce the strongest spirit is known as spirit of wine and contains about 90 per cent of alcohol, the remaining 10 per cent being water. It is extracted from spiritous liquors of different kinds or from fermenting vegetable juices containing sugar by successive distillations. The alcohol being more volatile than water, accumulates in the first portion of each distillation. After a few operations, the spirit obtained is as strong as it can be made by this process and further repetition does not separate more water from it. To obtain absolute or pure alcohol the remaining water must be removed by means of caustic lime over which the spirit of wine is poured and left for a night, during which time the lime gradually slakes from the absorption of water and the alcohol is left to distil off.

Methylated spirit is a mixture of ordinary spirit of wine or alcohol with one-ninth of its volume of wood naphtha.

Wood Pulp. Trees of soft, corniferous species, such as spruce and silver fir, 20 years old and 6 to 20 inches in diameter at the base are most suitable for pulp making.

Copper Sulphate or Blue Vitriol is obtainable commercially in the form of transparent blue crystals fairly soluble in water. One hundred parts of water dissolve at

50°	68°	86°	122°	158°	194°	212° F.	
37	42	49	66	95	156	203	parts of copper sulphate

Copper sulphate $Cu\,S\,O_4\,5\,H_2O$ is made from metallic copper, usually scrap copper which is heated in a furnace, sulphur being afterwards added and the doors shut. After some time the doors are opened and the heat is increased so as to oxidize the sulphide with sulphate. The hot mass is withdrawn, immersed in dilute sulphuric acid and after settling is decanted, concentrated and crystallized.

Carbon Bisulphide or Disulphide $C\,S\,2$ which is used as a solvent for nitro-cellulose in carrying out the Viscose process, is a colorless liquid, heavier than water and quite insoluble in it, which gives off an extremely offensive and inflammable vapor. The inhalation of this vapor is injurious to the health of the work-people and fans or other methods of ventilation should be provided to carry off the vapors and prevent their being inhaled.

Carbon Bisulphide is prepared by passing vapor of sulphur over red hot coal or charcoal. Vertical cast iron or earthenware retorts are used. The top of the retort is provided with two openings, one for the introduction of fresh charcoal and the other for leading off the vapors to the condenser, while the sulphur is introduced through an opening, at the bottom of the retort. This latter opening is fitted with an inclined tube, down which the sulphur runs and is vaporized on flowing into the retort. The vapor

passes up through the mass of charcoal and the greater part of it is converted into carbon bisulphide. The vapors leave the retort by a tube in which the sulphur condenses and flows back again into the retort while the carbon bisulphide, which is far more volatile, passes on into another vessel in which any residue of sulphur is deposited. The vapors are condensed in a condenser and the liquid is collected in a receiver and is drawn off through a cock.

Nitric Acid, $H N O_3$, which is used to nitrate cellulose for solution in carbon bisulphide, is usually obtained from one of its salts, called nitrates, by means of sulphuric acid. Nitric acid is prepared by distilling Chili saltpeter with strong sulphuric acid from iron retorts. The following equation shows what takes place:

$$2 Na N O_3 + H_2 S O 4 + Na_2 S O 4 + 2 H N O_3$$

Strong nitric acid has a specific gravity of 1.42 and contains about 70 per cent of pure acid. The very strongest and purest acid has a specific gravity of 1.5, that is to say, it is half as heavy as water and contains over 90 per cent of pure acid.

Viscosity is a property possessed in a varying measure by all fluids. Its meaning may well be illustrated by comparing methylated spirits with molasses or syrup. Both are fluids, yet the latter is relatively thick and slow running and very similar in consistency to solutions of cellulose suitable for the manufacture of artificial silk. Upon the degree of viscosity possessed by this cellulose solution depends the pressure required to press it through apertures of given diameter, or given constant pressures the diameters of apertures required to produce filaments of given denier. In practice the diameter of the solution distribution pipes required also depends upon the viscosity of the solution which has to be forced through them. Since the evenness in size or denier of the artificial silk produced depends almost entirely upon the uniformity in the viscosity of the solutions supplied, it is very necessary that a means should be provided for accurately measuring viscosities so that uniformity may be secured.

Viscosity may be tested by means of instruments called viscometers, the action of which is usually based upon the principle of determining the time occupied in the outflow of a specified quantity of solution through an orifice at a given temperature.

Ice & Icemaking is of interest to artificial silk manufacturers from the fact that ice has very frequently to be used to maintain the low temperature favorable to the solution of cellulose in its solvents. The mechanical production of cold and of ice for local application is generally carried out on the ammonia compression system.

Anhydrons Ammonia has many advantages as a refrigerating medium. Perhaps the chief of these is its high latent heat of vaporization. The low pressure also at which it is possible to work is a great advantage and makes the possibility of an accident very small. In tropical climates there is no question that ammonia is by far the most efficient refrigerating medium. The pungent smell of ammonia, which is often brought forward as a disadvantage, is really a strong argument in its favor, as by means of this, any leak is instantly detected and may be rectified, thus preventing a constant source of expense experienced by users of other refrigerants. Anhydrons Ammonia, too, has no effect on iron or steel.

The principles involved in the process are briefly as follows: the ammonia in the form of a gas, is compressed in a compressor and discharged through an oil separator to condensers. The oil separator is for the purpose of preventing any oil which may be carried over by the ammonia gas, getting into the condensers. The ammonia gas, under a pressure of from 150 to 200 pounds per square inch, is then condensed into a liquid in the condenser and flows into a storage tank. The liquid ammonia is then expanded through coils of pipes (being regulated by an expansion valve) in this process becoming again a gas and absorbing the heat from the surrounding air if it is intended to cool it, or from the surrounding brine if ice is to be formed in cans plunged in that brine. The gas is then re-compressed by the compressor and the whole cycle of operations repeated.

NOTES ON DYEING, BLEACHING AND FINISHING.

BY J. MERRITT MATTHEWS, PH.D.

Sizing of Cotton Goods in Relation to Subsequent Processes.

Certain of the ingredients employed for sizing warp yarn exert very injurious effects upon the cloth in some of the subsequent processes through which it is required to pass, that is to say, singing, bleaching, dyeing and printing. It is known that a moist atmosphere and a certain amount of moisture in the yarn are practically essential to insure good results in the weaving. Under humid conditions sized warps are very liable to develop mildew while standing in the weaving sheds or rolled up on the weaver's beams. The sizer, therefore, incorporates a small amount of zinc chloride with his dye, which acts at the same time as an antiseptic and as a deliquescent. Other chlorides are also frequently employed as deliquescent agents, such as, for instance, magnesium and calcium chloride.

All these chlorides tend to dissociate when heated above a certain temperature, and cloth containing them is liable to become tendered after passing through the singing process. The heat of the singing machine liberates hydrochloric acid, which destroys the fibers in the cloth. The damaged parts are often irregularly distributed over the cloth, and they betray themselves in the form of large or small holes with clean-cut edges distinct from the frayed edges of mechanically damaged cloth.

Another objectionable substance often used in sizing is paraffine wax, the object being to lubricate the sized threads for the weaving process. Tallow is the proper substance to employ for this purpose, but paraffine is used either consciously because it is cheaper, or unconsciously in the form of adulterated tallow. Paraffine wax and similar unsaponifiable substances are not emulsified in the boiling processes to which the goods are subjected preparatory to bleaching or dyeing. The wax is simply loosened and floats to the top of the kier and settles on the goods in the form of a scum, producing gray water-resistant stains which cannot be bleached or dyed. Sometimes the wax remains evenly distributed over the cloth without forming patches, in which case the fibers remain absolutely resistant to the calendaring operation and the cloth finishes up quite limp. Mineral oil stains derived from the lubricating oil of the loom or other machinery are likewise objectionable, and it has been clearly demonstrated that mineral oil stains resist all known

processes of bleaching, but it would appear that a mixture of vegetable and mineral oils is not so harmful.

In the discussion of this article it was pointed out that the use of deliquescent chlorides is not confined to the object of facilitating the weaving operation. Magnesium and calcium chlorides are used illegitimately for the object of increasing the weight of the cloth. These chlorides increase the weight not merely by the excess of moisture they attract, but also by enabling the cloth to carry more filling. Heavily weighted goods are sent to the bleacher with instructions to finish to loom weight, and the bleacher first has to take out all the filling and then replace it to an equivalent weight in finishing the cloth. In extreme cases as much as 50 to 60 per cent of added weight is demanded, and it is impossible to obtain such results without the use of deliquescent chlorides. Even the smallest proportion of magnesium chloride is dangerous if the cloths have to be singed. Yorkshire grease has been mentioned as a substitute for tallow, but this is also not always safe.

Yarn from Paper Pulp for Textile Manufacturing.

In a recent paper presented to the Journal of the Textile Institute attention has been called to several processes which have been worked out for the manufacture of textile yarns from half manufactured paper. Turk's process by which "Licella" yarn was made at Waldhof, Germany, has been abandoned. Kron's process for producing "Silvalin" yarn is still being worked by Hammern and very satisfactory results are evidently being obtained. The manufacture of yarn from finished paper is being carried out under Claviez patent in Austria and Saxony, the product being sold as xylolin.

The observations made in this article go to show that finished paper is a very suitable starting point for the manufacture of yarn on a large scale but that Claviez process is too cumbersome and laborious to form the basis of a large industry for a low-priced article. The Silvalin factory has introduced, however, machinery which greatly simplifies the manufacturing process. Particularly a slitting, dividing and reeling machine for producing the narrow strips of paper on bobbins or a wheel of 19¾ inches in width has done much to solve the economic problems of the industry.

By this process the strips are dampened as they are unreeled for spinning and the bobbins may therefore be stored for any length of time. These strips are twisted on a modification of a ring spinning machine. Yarn is produced from the original reel of paper according to the new process in nine operations as compared with 102 operations on the old plan. Of commercial grades of paper, Swedish *Kraftpapier* undoubtedly gives the best and strongest yarn, but improved results are to be expected from paper made especially for the purpose. A concern formed to undertake the manufacture of paper yarn in Sweden, it is said, controls its own spruce forest and manufactures the pulp and paper to be used; it is estimated that if spinning were begun at the rate of 5,000 tons per year, yarn could be produced at prices ranging from 2¾ to 5 cents per pound, according to the size of the yarn. There is a large outlet for fabrics composed wholly or partly of paper yarn to relieve the constantly increasing demand for jute and cord cotton, thus cheapening the fibers for finer manufacturing purposes. Paper fabrics are admirably adapted for carpet and upholstery work. Also for packing purposes—especially for packing wool.

The Action of Neutral Salts on Bleaching Solutions.

Higgins has recently conducted a series of experiments to show that chloride of sodium and calcium stimuluate the bleaching action of chlorine water and of hypochlorous acid, as well as that of hypochlorite solution. In all cases the action is precisely the same; it is an immediate one, after which the solutions behave as though the chloride had not been added. These observations are opposed to the representation of the bleaching action of hypochlorite in the presence of chloride as being due to the development of chlorine according to the equation: $NaCl + NaOCl + H_2O = 2NaOH + Cl_2$; for this explanation does not account for the observation on the other bleaching solutions, and if it were true one would expect sodium chloride to cause a steady acceleration and not a sudden action as long as any sodium hypochlorite remains in solution. The reversible reaction as follows: 1. $HCl + HOCl = H_2O + Cl_2$, and 2. $NaCH + Cl_2 = NaCl + HOCl$, were found to explain all observations including the behavior of bleaching powder solutions with natural chloride. The bleaching trials were performed on weak solutions of dyestuffs and upon the coloring matters of cotton and linen cloth. In all cases practically the same results were obtained showing that the same chemical action took place during the oxidation of all the coloring matters used.

Solutions of neutral salts were also found to decrease the stability of solutions of potassium permanganate in air and to increase their weakening effect so that for permanganate solutions as for hypochlorites, it is evident that instability and bleaching effects are related.

Electrolytic Production of Bleaching Liquors.

Much experimental work has recently been done on the electrolysis of solutions of alkaline chlorides with the end in view of producing bleaching liquors. The easy limitation of the increase of hypochlorite concentration at the anodes due to cathodic reduction is presented by the addition to the electrolyte of calcium chloride or alkaline chromate, whereby there are formed around the cathode, diaphragms of calcium hydroxide or chromium chromate, which prevent or lessen diffusion on anodes to cathodes. The conditions favorable to the formation of hypochlorite and unfavorable to its destruction with formation of chlorate are found to be as follows:

1. High chloride concentration.
2. High current density.
3. Low temperature.
4. Neutral electrolytes.
5. Platinized electrodes.

Conditions 2 and 3 are antagonistic, and it is therefore necessary with high current density to cool the electrolyte continuously. But cooling below 10 degrees C. is not desirable, as at lower temperatures, separation of a solid substance, probably chlorine hydrate, at the anodes occurs and interferes with the reaction. Rise of temperature from 15 to 30 degrees C. on the other hand reduce the attainable concentration of hydrochlorite with current density of 0.015 to 0.12 amperes per cubic centimeter, by 18 per cent of its value at 15 degrees C. In laboratory experiments neutral bleaching liquors were obtained containing 80 grams of available chlorine per litre. These, however, involve a very high expenditure of electrical energy, about 14 times the theoretical amount. Weaker solutions, however, can be produced more economically. Solutions containing 37.5 grams and 17.5 grams, respectively, of available chlorine, requires 1.77 and 1.17 times the theoretical expenditure of

energy. With very high current density there is little or no advantage in a platinized electrode; but with cheap electrodes and lower density the advantage is considerable.

Geibel's observation has been confirmed that the gray platinized electrodes of Heræus answer admirably for this work. The increase of current density caused by substituting a grating or electrode of wire for a sheet metal electrode does not result in a corresponding increase of yield possibly because the higher current density is to some extent counterbalanced by the greater ability for diffusion of chlorine away from the cathode towards the anode. The industrial electrolytic preparation of hypochlorite was formerly carried out in a cell devised by Kellner consisting of a stoneware trough containing vertical glass partitions reaching nearly to the bottom and in which the electrodes were supported. The liquid was made to circulate again and again through the cell by a pump till the maximum concentration of hypochlorite was reached. Using a 10 per cent sodium chloride solution, a liquor containing 10 grams of available chlorine per litre was obtained corresponding to about 66 per cent of the current and at an expenditure of 6 Kw. per hour per kilogram of chlorine.

The low yield was probably due to wastage by the passage of current from end to end of the coil below the glass partition, and better results have been obtained by a cell also devised by Kellner, in which the liquid flows from side to side parallel with the glass partition and through narrow semi-cylindrical troughs which connect the divisions of the cell. Each division is at a slightly lower level than the preceding one, and thence double polar electrodes are used. Each time it passes out of the cell the liquid is cooled before re-entering and a little calcium chloride and turkey red oil are added to the electrolyte to produce a cathodic diaphragm of lime. Using 15 per cent of salt solution from 30 to 35 grams of available chlorine per litre can be obtained with this cell at an expenditure of 6.4 to 7.1 kilowatt hours per kilogram of chlorine. The improvement is largely due to the lessened wastage of current to shunt circuit, partly also to the higher density of current which is allowed by the rapid circulation and good cooling arrangement.

The increased rate of diffusion from the anode which might be expected to result from the rapid circulation of the electrolyte, is lessened by the arrangement of having the entrance and exit of the liquid above the electrode and also by the anode being below the cathode and thus as far removed as possible from the place of greatest motion. As in all such cells, however, the circumstances are favorable to the absorption of atmospheric carbonic acid and small additions of alkali must be made from time to time to counteract the effect of this on the hypochlorite. Moreover, platinum must be used for both electrodes and the cathode platinum is subject to slow disintegration from the formation of sodium platinum alloy and its subsequent decomposition.

A cell devised by Schuckert contains alternate single-pole electrodes, the anodes of thin sheet platinum 0.02 mm. thick; the cathodes of carbon. From such an electrolytic cell the liquid flows beneath a glass partition into the adjoining slightly lower cooling cells, and from this over the upper edge of another glass partition into the next electrolytic cell, and so on. Calcium chloride and hydroxide and rosin soap are added to the liquid to form the cathode diaphragm; and owing to the alkalinity of this addition and the less exposure to air no alkali need be added to counteract carbon dioxide. The cooling is not so efficient as in the Kellner cell and the temperature in the electrolytic cell reaches 35 to 40 degrees C. But the results are comparable with those last quoted. For weak liquors, cells with carbon anodes can be used; but high concentration cannot be attained with them, partly because the reaction goes on within the porous anodes as well as at the surface, and the liquid which cannot freely diffuse becomes impoverished, partly because of the slow, yet continuous oxidation of the anodes and production of carbon dioxide. Hans & Oettel have devised such a cell; the electrodes are carbon plates which with lateral continuations of glass form partitions in the trough. The liquid enters at the bottom and leaves at the top to be cooled; each electrode is anode at one side and cathode on the other. The results obtained are similar to those obtained with the old form of Kellner cell.

Instead of producing bleaching liquors directly, the electrolytic process may be used to produce chlorine, which is then caused to act on milk of lime or alkali solutions also produced by the electrolysis. The chlorine is produced at a lower cost for power than the equivalent amount of hypochlorite and any concentration of bleaching liquor can be produced with equal ease. Moreover, the large quantity of sodium chloride solutions run to waste, while the direct bleaching liquors are saved. On the other hand, the bleaching properties of the solution are just as high and the alkaline hydroxide simultaneously produced has to be dealt with and is a by-product of considerable value. In the Hargreaves-Bird cell, the iron cathodes rest against a separate plate, forming the wall through which the liquid slowly percolates into a neighboring vessel, where it is carbonated; the carbonate is more easy to crystallize and more easily sold than the hydroxide. In a similar cell with horizontal electrodes devised by Billiter, the caustic liquor soaks through a false bottom of asbestos and is then concentrated, yielding 50 per cent caustic soda and salt, which is returned to the process. The indirect process cannot profitably be embarked upon unless an annual yield of at least 5,000 tons of bleaching powder is needed, save where the cost of transporting the bleaching powder enhances the price and the cost of power is low.

For smaller demands it would be better to buy the bleach or to make it from milk of lime and liquid chlorine, or to make hydrochlorite directly according to circumstances. It may even be advisable to electrolyse hydrochloric acid or a mixture of salt solution and sulphuric acid, in which case hydrogen is involved at the cathode and there is no alkali to be dealt with. Parenthetically it is pointed out that sodium perborate is now coming into commerce as a bleaching agent and may under certain circumstances present advantages over hypochlorite. Alkali hypochlorites are in general preferable to bleaching powder, partly because by insoluble organic salts of calcium depositing in the fabric impede the action of bleaching powder and require for their subsequent removal longer treatment and stronger acid than sodium compounds, and partly also because they are already neutral or faintly acid, while bleaching powder is alkaline and must have acid carefully added to it before it will bleach rapidly.

Don't be afraid of honest competition. It's competition that makes success worth while.

Don't be afraid to do more than is required of you.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all. Suitable letters are paid for in cash.

MORE ABOUT CUT WASTE.

Editor Cotton:

A recent letter entitled, "Reducing the Amount of Cut Waste," brought to light a number of little things that overseers overlook very often, and at the end of the week wonder why their production is low, and the amount of cut waste high. The letter dealt more with the card and spinning rooms. This article deals entirely with twisters.

The writer was working in a room where the twisters were in very poor condition, that is, they were in need of new rails and rings, which if furnished would have continued to do good work for a few more years and saved the expense of buying new machinery.

Some fixers have peculiar ideas about keeping the rails all even with one another, whenever one rail is higher or lower than the other, they hit the bracket (g) that supports the lifting rod (b) with a hammer. If the rail (a) is lower than the other, they hit the bracket (g) forward towards the head of the frame, which would, through the adjustable foot (d) and (e) which is fastened to the bracket (g) raise the rail (a) to its right position, and if the rail (a) is higher than the other, they strike the bracket (g) at (k) which is close to the rail (j) which forms the frame work of the machine, this would lower the rail (a) to its right position.

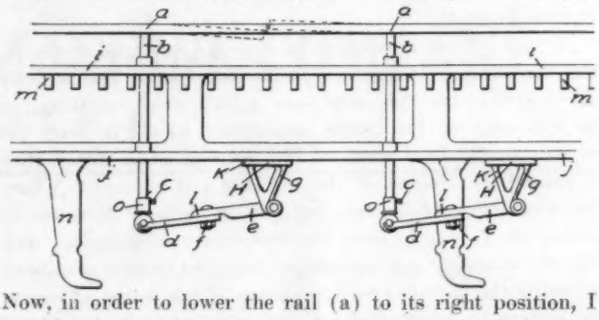
The writer admits this will level the rails and keep them even, but for a short while only, and it is a very bad practice and should never be allowed, because it not only loosens the bracket (g) from the frame work of the machine, but the rails slip back to where they were before the fixer had struck the bracket, therefore causing bad work again.

I once repaired some frames that were in bad shape as follows:

When the frame was ready to doff, I called the doffer, who in turn doffed it off, then I took a rule and brought every rail down to four inches from the rail (i) on which the bolsters and spindles are set, which is marked (m) in the illustration; then after seeing that all the rails were level, I started on the other side doing the same thing, after which I started up the frame and waited until the next time it doffed, so as to see if the yarn on the bobbins was all even. This done, I began on the next frame and soon had all the rails even with one another, the dotted lines show how some of the rails were before they were fixed.

This was accomplished by setting the bracket (g) in its right position, then tightening the set-screw (h) thus holding the bracket (g) firm in its position, then I would loosen the set-screw (c) which holds the jack screw (o), this done, I would hold the lifting rod (b) with one hand, and with the other I would turn the jack screw (o) which would either raise or lower the rail (a) as desired, then I would tighten the set-screw (c) thus holding the jack screw (o) in position and also the rail.

This worked fine on some frames, but on others it only lasted a few days, then back went the rails to where they were, some higher or lower than the others, as shown in the illustration by the dotted lines, because some of the lifting rods had the threads at the end all worn out, therefore, the jack-screws, which were also worn out, could not hold long. I called the superintendent and told him that if he ordered some new jack screws they would hold the lifting rod (b) in position a long time, but he refused and said, "Do the best you can." I did, for the next day I again started working on the rails, but this time I took pieces of card-board with me, then I unloosened the set-screw (f) and slipped a piece of card-board between (l) and (f), then tightened the set-screw (f) which in turn would raise the lifting rod (b) also raising the rail (a).



Now, in order to lower the rail (a) to its right position, I would unloosen the set screw (c) and turn the jack-screw (o) from left to right, thus allowing the jack-screw to work on the threads higher upon the lifting rods (b) which were in good condition, then I would tighten the set-screw (c) which would hold the jack-screw (o) firm and also keeping in good order for a great while.

What would the readers of Cotton do if they were refused the very parts that go on the frames, that is, those that are interested in this department? Well, that is just what happened to me. I asked the superintendent for 200 new rings. He laughed at me and said, "What are you going to do with them?" I told him that if the firm bought new rings that I would help the fixer put them on. Finally, he agreed and after counting all the broken and bad ones, also those that were off, we needed just about 200, so when the agent came around, the superintendent asked him if he could send for some new rings, to which he said that he would send for 100 only, so when the superintendent told me this, I just simply told him that I was going to start putting on new rings. I would not stop until every spindle was running, just think of having ten and twenty spindles stopped on some frames for want of new rings.

Is that increasing the production? Just one spindle stopped on each frame will make a great difference at the end of the week, and just think of the number mentioned in the above case, being stopped, and yet he was refusing new rings.

Well, after a while, I got the 200 new rings. It was

a pretty hard task that we had forcing in those new rings, but I had every spindle running inside of nine days. Then I called the superintendent and showed him the way the frames looked with every ring on, and every spindle running. It not only increased my production at the end of the week, but he was so pleased that he kept sending for more new rings and also kept getting after the agent for anything that I needed, so as to have the frames in good working order. When the second supply of rings arrived, the men of the machine shop were the ones who had the job of putting them on, as I told him that I had put on the first ones just simply because I wanted to show him how his production would rise at the end of the week.

How many of us have had to face the same proposition in order to turn out good work, and also to have the room as near decent as possible? Does one expect to keep the help working in a room where the rings are constantly falling off and the frames running bad?

The reason that I put these few points together with the letter entitled "Reducing the Amount of Cut Waste" is that if the rails are set right and on a level with one another, the amount of cut waste will be reduced.

Tab. (Massachusetts.)

ENDS RUNNING OVER ON FLY-FRAMES.

Editor Cotton:

I read "Wash's" remarks on running over and under in the June issue of Cotton with interest, but he should read my article in the February issue a little more carefully, as he misconstrued the fourth paragraph which, in part, he repeats in the June issue. I did not say, as he states, that it caused the trouble of the carriage rail changing before the completion of the lift, but that it *"helped"* to cause it, owing to it not keeping the twin-gears in position, and thereby throwing out the catches from the tension gear, and allowing the rack to run down some, which would of course be certain to reverse the rail before it ought to be, but if it slipped more than one tooth we know it would ease the winding so much as to break all the ends. I don't see how a frame could change at ¾ of the traverse if the above was not the cause, if no gear was slipping which would bring the poker-bar nearer the inner end of double slide bracket and which would also change the traverse.

How it could keep on doing it every few minutes and the machine still keep on running until the end of the set is more than I can believe without seeing it. I was not so fortunate as to be a subscriber to Cotton at the time "Wash" wrote his letter last October, which he wants me to read, although I had seen one or two other issues of your magazine, but I can assure him that I have never missed reading them since, as that part of Cotton is the first I look at every time I get it. "Wash" tells us that the better method is to rub the latches at doffing time, and take the builder out Saturday, thus proving what I said, that rubbing them with emery only fixes running over temporarily, or else why would he need to take out the builder at all.

Filing the latches square to the rocker is all right, but they must be long enough, or the rail when started up after fixing will run to about ¾ of traverse and stay there, as it is just about balanced at the commencement of a set, and this will put a ridge or lump on the bobbins. If the latch is shortened through wearing, it generally makes itself known (apart from some of the bobbins running over or under) by the rail dropping when the bobbins are nearly full, owing to the extra weight of the bobbins overcoming the balance-weights.

In regard to the question asking me to see how long it would take me to reduce a piece of metal 1/64 of an inch by rubbing it with emery, it would take me just half as long as it would to reduce it 1/32 of an inch. The answer, I admit is just as immaterial as the question. Rubbing with emery does not lengthen anything and the old saying is, that it was the last straw that broke the camel's back. That is the reason why I said that rubbing with emery shortened an already too short latch. Perhaps it is as "Wash" says, that what is right for one type of buidler is not right for another kind and so let us hear what you think or know is the cause of the traverse changing before it should do. I have been puzzled many times, but have never given up, and all our machines are running, as they are in hundreds of other mills, but we all want to increase our knowledge, as we never know when it will be required. I have never worked on any other frames except the H. & B., and so cannot speak of the details of other makes.

"Wash's" last statement will be conceded by practical carders to be a little off. Most men who understand the building motor know a little about flyers too. I have worked at a mill making 16 and 20 hank roving, without having any pressers on the flyers. Flyer trouble is mostly caused by not oiling the spindle tops, and not cleaning the the inside of the tube. The oiling should be done once a month, and the flyers should be cleaned by placing a spindle in vise to put flyers on, and running a strand of rope dipped in whiting through them and so polish them inside. Also when putting on a new presser be sure and file off enough of the part that runs through the two shoulders on the tubular leg of flyer to give it as much clearance when opened, as there is between each leg and center of flyer or it will make a beaded bobbin.

Lancs. (Michigan.)

AN ANSWER FOR "COMBER."

Editor Cotton:

I will answer the question of "Comber" in the June issue to the best of my experience, which is on 1 3/16-inch peeler cotton, and I am getting good results and production.

The first thing to do is to take off the cams. Then take out the top feed roll and the detaching rolls. Then take out the lap aprons and loosen the collars that hold the top cam in position. Then unhook the feed roll springs and turn the hooks back out of the way. Take out the doffer bonnets and the doffers and the nipper rods, and if the brushes have been run for several years, the brush shaft can be taken out and the brushes turned around, and they will do as good work as new ones for several years more. After the brushes have been turned around they can be put back into place.

Take the nipper frames out and slide the feed roll out end-ways; then disconnect them and take them in a vise and set each frame screw up in the vise, and by means of the two set screws at the back of frame, set the cushion plate to the nipper knife, using a 2 cam gage; then make the nipper knife hold paper its full length. This is done by scraping off the high places on fibre between the nipper blade and the clamp. Then the detaching rolls can be put in place and set to the segment of a 22 cam gage. Then put the feed roll in the bearings and set to the detaching roll to 1⅞ finger gage; set the cam shaft to a 7-inch gage. Then

C. E. RILEY, Pres.
Boston Office
65 Franklin Street

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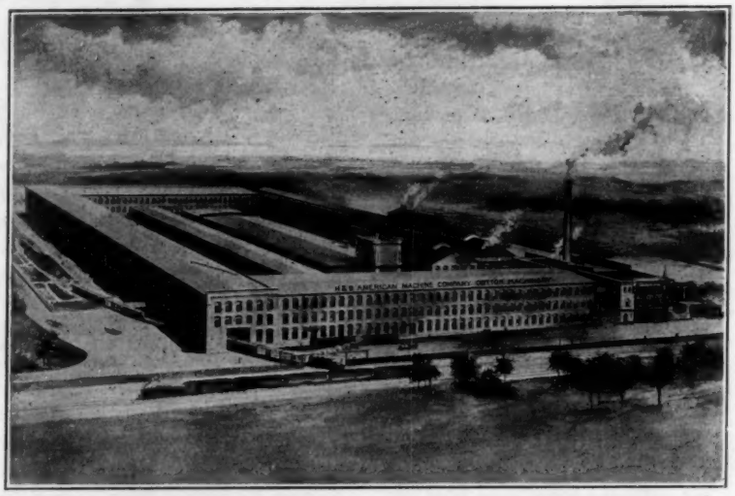
814-815 Empire Bldg.,
Atlanta, Ga.

COTTON MACHINERY

Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

that pull the hardest. Then take some small tweezers and connect the nipper frames all together on the floor and slide the feed roll in end-ways. Put the frames in place and set them.

The first thing to do is to get the right angle; for 1 3/16 inch stock 34 degrees is all right Then begin in the middle of the machine and set the two middle frames. Set the front edge of the cushion plate to the detaching roll with a 15/16 finger gage, and set the cushion plate frame segment with a 19 cam gage. After these two are set, set the one end frame at the gearing head as the two middle ones, then set the two between the middle and the end frame. Then go to the other end and set the end frame. Then the two next to the end.

Sometimes the frames are not true and the angle has to be changed to get the cushion plates all in line with the detaching roll. These frames can be set by starting at the end and using a line, but it is not good practice, as by starting in the center it makes it easier to set and gets a better setting much quicker. The angle screws can then be tightened like the one that has the angle set on the nipper knives with the jam nut and place a piece of paper behind the two front ones and run the one up until the paper gets tight on both screws. Then run the back ones up and give them a quarter turn, and tighten the jam nut if the jam nut is behind the frame. If it is in front of the frame, run the screw up to touch the stand and tighten the jam nut, and it will draw the screw in about a quarter turn. Then the nipper rods can be put in. Set the cams to make the detaching roll turn forward at 6 on index. Then turn the index to 10½ and set the rods. Make the nipper knives just hold paper. Turn to 11¼ and gage the nipper knives and needles with a 21 gage. Then turn to 10½ and make both sets of nippers close on paper.

Now put on the cams and give them an angle of 28 degrees and have the cam 1/32 from the leather detaching roll. Use a leather roller when putting the angle on the cam and set the cam to the segment of a 22 cam gage. After the cams are set the springs can be put on the feed roll hooks and the lap aprons put in place. All parts that the sliver passes over should be polished with metal polish and whiting. This setting gives good results and gets a big production on 465 grain lap, with 16 per cent waste and 49 grain sliver, using 1.30 nips per minute with an 11-tooth feed gear. After starting the comber, take the percentage of waste, and if it is 2 or 3 per cent too much, the feed disk can be moved back two or three teeth; and if it is not enough, it can be moved up one tooth for each 1 per cent of waste. W. N. S. (North Carolina).

A BOSS KNITTER'S EXPERIENCE.

EDITOR COTTON:

I had a few experiences while running 26's carded yarn on a 12 cut cylinder that may be of interest to your readers. When a knitter is not experienced in this line of work, the best thing to do at the start is to study the nature of the machine. The first thing is to have the stop motions in perfect working order. Sometimes the tension springs will be uneven which would make no difference in running larger yarns, but would cause a great deal of trouble with smaller yarns, like 24's, 26's and 30's. It is best not to touch these unless it is absolutely necessary. I have found the best way to do this is to test them out and mark the ones with chalk

open the coils until the same tension on all is secured. Any boss knitter who will see that the stop motions are kept clean and wiped out once or twice a week will have little trouble with them.

When I took the job as boss knitter in a certain mill, I had had very little experience with light weight goods. On arriving in town I went down and looked over the room. I knew I had work before me that would require ten hours a day for a few weeks at least. After going into details with the superintendent about the class of work expected, I went into the knitting room to see in what shape things were kept. The head cutter came to me about this particular machine doing bad work, but I did not open my tool chest for a day or so. I studied the holes, dropped stitches and run-downs and their causes. The second day the superintendent called me over to the cutting table and unwound a roll of cloth. This had been made on a body machine, but it had to be used for gussets. There looked to be about two holes to every foot of cloth. He said he wanted me to tackle that one first.

I lowered the dial enough to just give a needle working play between the cylinder and dial, reset the heads and feeds, then looked over the dial cams. I found one that was drawing three or four times as hard as the rest. The end had been broken off and it would push in or out at any time. I took out the lint gathered behind the feed and caught in the needles, and put new threads on the screw, which held it in place until I could order another one. I then set the stitch at 24 to the inch. I had the knitter keep his eye on every yard of cloth it turned out that day, but I got no more calls from him. When the cloth was cut off, I marked it "Special," and sent it through the bleach in order to get it out as quick as possible. The superintendent was well pleased with results.

There were six more machines almost as bad as that one, but when I tackled them it was not so easily done. Now, I don't mean to knock a man, because I believe a man will do what he thinks best when a machine gets beyond his understanding, but for some reason of his own this former boss knitter had ground the feeds off until it was impossible to set them so they would not make dropped stitches. I called the superintendent over and showed him the trouble and had him order me four sets of feeds. I want to say here that this knitter is not the only knitter or fixer that I have seen who believed too much in the emery wheel. When you see a knitter always using a slot file or the emery wheel, you will see one who is never without trouble.

Sometimes when a machine is built for one class of work and you want to change it over to another, it is necessary to do some grinding, but a polishing wheel is all that is needed for cams. I say this for three reasons: first, because I have taken two jobs in the last few years where the emery wheel has caused the other man to lose his job; second, because any knitting machine manufacturer will send a guarantee with every machine to do perfect work and if it does not he will replace it with another one, but he will not accept it back after it has been ground beyond repairs; third, it is a bad example to set for the fellow who wants to learn the business and is watching every crook and turn the fixer or boss knitter is making.

After I received the new feeds for these machines it was only a short time until I had everything in proper shape and was turning out from three hundred to three hundred and twenty-five a day and averaging 3 7/17 pounds to the dozen. They had formerly turned out about 250 per day at an average of 4 1/16 to the dozen, but it took work to do this and I had all kinds of little troubles to overcome which I will explain in a later letter.

"Boss Knitter." (North Carolina.)

SOME TROUBLES AND THEIR REMEDY.

EDITOR COTTON:

Attention is frequently called to the serious mistakes made by many manufacturers when making repairs and improvements on machinery, but there are also mistakes made in the operation of the mill. For instance, when we time the front rolls in a ring spinning room and find in most cases the speed of the front rolls varying from two to three turns, and in some mills a much greater variation, the front rolls receiving power from a belt on the main shaft making the largest number of revolutions.

What is the cause of this expensive loss of power. and what is the remedy? The cause of so much variation in the speed of the front rolls in a ring spinning room is the necessity of having a very large pulley on a shaft driving another pulley of a much smaller diameter on a frame. This, of course, reduces the working surface of the belt on the smaller pulley, and the belt has very little chance of clinging to the small working surface offered.

Many mill men make the mistake of using a double belt instead of a single belt to drive the frame in order to overcome this friction. This is a step in the wrong direction, because no benefit can be derived from a double belt, as a heavy belt will not hug the small pulley as closely as a single belt, owing to the resistance that the strength in the cross section of the double belt offers to its bend around the smaller pulley.

This variation of speed on the front rolls makes the doffing time vary also, and if a system is not adopted to doff the frames on the line shaft first and work toward the window alleys, some bobbins will not be properly filled, which is very costly in the spooling room.

It should be the aim of every spinner to fill the bobbins as much as possible, because when bobbins are not filled as they should be the spooler box will contain much more wood than yarn, which is very expensive.

The only cheap remedy for all this trouble is a little belt dressing applied with judgment to make the belt cling to the small working surface of the smaller pulley. All shrewd manufacturers are alive to this fact, and are never without some brand of good belt dressing, because they know full well that the small expense of belt dressing is doubly returned in production. Good belt dressing entirely eliminates the initial tension required on belts not using belt dressing, thus saving the belt and relieving much weight from the bearings, which saves much wear.

All up-to-date carders and mill men agree, to a man, that the uniform tension on a speeder depends on a small piece of belting—the cone belt—and although some makers claim that they have a cone-driven speeder, the fact remains, to date, that on all speeders, except one make, the bottom cone drives the bobbins.

Examine your cone belts and you will find they all have a tendency to curl on the side. There are two reasons for this: (1) The outlines of the cones necessary to obtain the intermediate speeds; (2) the slipping of the cone belt. This plainly shows that there is a certain amount of fric-

Barrett Specification Roofs

We had to photograph half the town to show the Barrett Specification Roofs on this plant!

A MILE of Barrett Specification Roofs! 750,000 square feet! And they probably won't cost another cent for twenty years! Sometimes such roofs last even thirty years!

You would suppose that such cost-free, care-free roofs were high-priced. Not at all. A Barrett Specification Roof is the *lowest priced permanent roof covering known.*

Then why doesn't everybody use them?

Well, almost everybody does who has a *big* roof. For the bigger the roof, the more careful the investigation of costs and service and the bigger the saving.

To architects, engineers and owners we say —Incorporate The Barrett Specification in full in your building plans.

It furnishes a standard and fair basis for competitive bids; it removes the temptation to "skin the job"; it insures the best roof at the lowest price.

A copy of The Barrett Specification will be mailed free on request.

HYDRONON
The Damp-proofing Paint
Especially recommended for use above the ground level on the interior of stone, brick or concrete walls to exclude dampness.
Has superior covering capacity and is vastly superior to other paints in its permanence and resistance to dampness.

TAR-ROK SUB FLOORS
They cost less than piers and heavy timbers and extra excavation necessary to provide required air space beneath. They provide for absolute rigidity. No vibration is possible, regardless of character of machinery.

VELVEX
Creosote Shingle Stains
Send for booklet, handsomely printed in colors, showing, the beauty of these stains. Very economical and satisfactory.

Special Note We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding. If any abbreviated form is desired, however, the following is suggested:
ROOFING—Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified and subject to the inspection requirement.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati
Pittsburgh Birmingham Kansas City Minneapolis Seattle
THE PATERSON MFG. CO., Limited: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

McClintic-Marshall Construction Company, Pittsburgh, Pa., Builders

tion on the cone belts, which is the cause of a varying tension.

If a little belt dressing is applied every morning to the cone belts, a more even tension will be obtained; besides, it will prevent much rack gear changing. It is very little trouble to apply belt dressing to the cone belts each morning. Just take a little at a time and apply to the belt while the frame is in operation. It keeps the belts clean, too. Try it. Some mills use castor oil, which makes the belts pliable, but does not prevent friction.

Wash (Mass.)

You'll get no profit on a frown unless you keep a jail, and winning rows won't bend you down beneath a load of kale, unless you win them in a ring, so chop the scowl and fight—be jolly—that's the proper thing—and be polite!

New Machinery and Trade Notes.

IMPROVEMENTS FOR FEELER LOOMS.

In the early days of the Northrop loom it was adapted only to the plainest weaves where the quality of the cloth woven did not call for matching the pick. As it grew in favor it became necessary to increase its field and to provide for making perfect goods by matching the pick when the bobbin changed. To do this successfully involved supplying a fresh bobbin of filling before the yarn on the bobbin in the loom ran out. This called for mechanism to feel the yarn remaining in the shuttle, and to call for a transfer of bobbins when the yarn was reduced to the critical point.

From the process of feeling for the amount of yarn on the bobbin arose the name "feeler" for the attachment used.

The DRAPER COMPANY have taken out more than 100 patents on feelers and feeler appliances. Among the various plans of operation, one which called for few adjustments, and which was practically certain to operate, was controlled by the point of the feeler entering a slotted opening in the bobbin.

As the point or end of the feeler was not obliged to measure the exact thickness of the yarn remaining on the bobbin, no adjustments were necessary. If the end of the feeler was admitted into the slot in the bobbin, the signal was given for a fresh bobbin, and the amount of yarn remaining on the old bobbin was only enough to carry the shuttle across to the filling battery, plus enough leeway for varying bobbins, etc.

To operate the system successfully, the bobbins had to enter the shuttle with their slots opposite the feeler slot in the side of the shuttle. The recesses in the filling battery were given straight sides to co-operate with the flatted sides of the bobbin. In practice it was found that it was difficult to transfer from the battery to the shuttle without the bobbin turning slightly on its axis; also, if not firmly held in the shuttle spring, there was a possibility of axial rotation. To obviate this difficulty, William Parker Straw, of Manchester, N. H., has devised a secondary spring to catch the flat sides of the bobbin as it leaves the filling battery, steer it into the jaws of the shuttle spring, and hold it when located in position so that the opening in the bobbin will always register with the opening in the shuttle. To still farther reduce the amount of yarn left on the bobbin, Mr. Straw devised an attachment for spinning frames whereby they are always started at one exact point on the traverse; a course of yarn is laid from this point to the bottom of the traverse, and, after reaching the bottom, the building motion fills the bobbin as usual.

A further necessity is a type of spinning spindle that always carries the bobbins at a uniform level, the Rabbeth patent centrifugal clutch spindle filling this requirement.

With these improvements the amount of waste per bobbin is extremely small—say *three to six yards* per bobbin, depending upon width of goods and other conditions. This waste is in itself so little that it has practically no grip on the bobbin and can be removed by hand without any mechanical bobbin stripper and as rapidly as the bobbins can be handled.

These improvements described have been patented by Mr. Straw, and the Draper Company has an exclusive license for their introduction and sale.

All these devices are in practical use on a large scale in the cotton and worsted departments of the Amoskeag Manufacturing Company at Manchester, N. H.

An inquiry addressed to the DRAPER COMPANY, Hopedale, Mass., will bring an illustrated circular and further information.

A MANUAL OF DYEING.

We are in receipt of a copy of the second edition of the third volume of the Cassella Color Company's series of dyeing manuals, which have been issued from time to time, covering various phases of the work of the dyer.

The volume before us deals particularly with the work of the garment dyer and certain other branches of novelty coloring. The little volume includes 265 pages, of which 140 relate to garment dyeing in particular, including special processes for coloring and stripping, waterproofing, dry dyeing, the re-dyeing of used leather goods, furs and rugs, bleaching, fireproofing of textiles, etc. This section also includes important practical information on the dyeing of hosiery, artificial silk goods, china, grass, the new Solidonia fiber, jute, etc., and this section of the volume alone will no doubt prove of very great value to garment dyers generally.

Part II comprises 42 pages of technical matter, including processes for the dyeing of feathers, straw, chip and tagal, human hair, natural and artificial flowers, leaves, grass, wood staining, celluloid, mother of pearl, horn and other similar products.

Part III includes 25 pages of technical matter devoted to the manufacture of pigment colors, colored varnishes, inks, typewriter ribbons, soap, wax, candle and fat coloring, besides including a valuable collection of recipes for the manufacturing of finishes for leather goods. The usual collection of tables and description of chemicals used in the art of dyeing are included in 48 pages, and leaves nothing to be desired in the way of accurate data, tables and de-

RU-BER-OID
PRONOUNCED "RU" AS IN RUBY
ALWAYS SPELLED WITH ONE B.

RU-BER-OID is the original flexible, prepared roofing. Its introduction, in 1892, followed years of experimentation, in which The Standard Paint Company employed the most skilled chemists of America and Germany. This opened a new era.

For the first time a ready-to-lay roofing was offered, which was free from the disadvantages of tar roofings, and which would not run under the most severe heat or crack with extreme cold. Its serviceability is vouched for by the fact that the first RU-BER-OID roofs applied in 1892 are still in good condition, still serviceable and weather-proof.

Critical facts for the Buyer of Roofing

KA-LOR-OID (Colored Ruberoid) came later, and possesses all the enduring characteristics of RU-BER-OID with the added feature of permanent colors worked into the best felt roofing procurable.

We originated, and have kept on improving

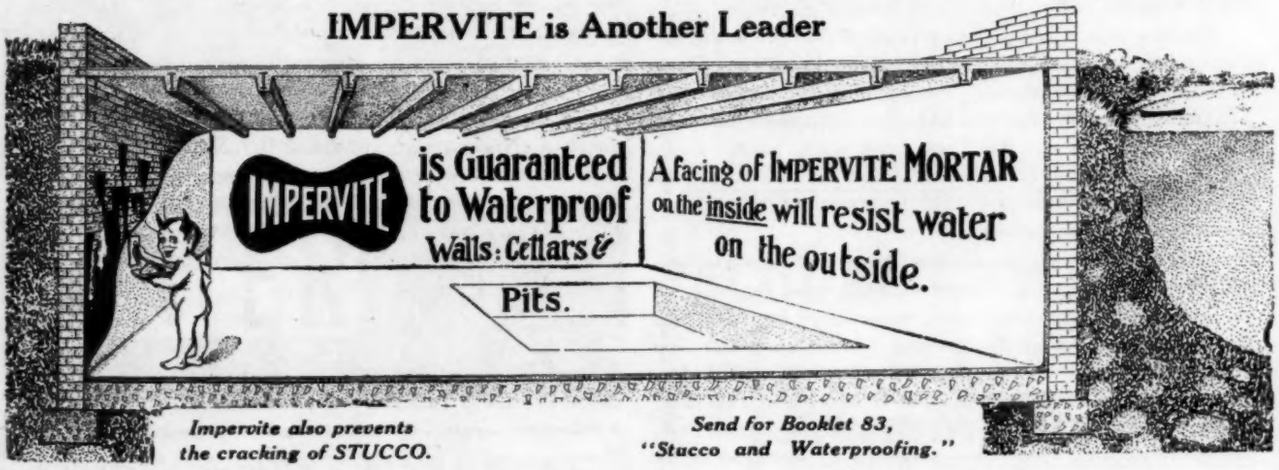
The only secret lies in the process of making RU-BER-OID Gum. This Gum is water-proof and flexible as new rubber. Yet, unlike rubber it retains these qualities when exposed to the elements. Rubber rots after slight exposure. RU-BER-OID and KA-LOR-OID retain their life and flexibility under the severest weather conditions.

RU-BER-OID and KA-LOR-OID (Colored Ruberoid) contain no rubber or tar. They are not "asphalt" roofings. They may be used on roofs from which drinking water is gathered without affecting the water in any way.

They are effective insulators, and exclude both heat and cold. They are fire-resisting. Hot coals thrown on them do not set fire to the roofing or to the sheathing beneath.

A lot of interesting information (with comparisons of various roofings) will be mailed on receipt of postal asking for Book 191.

IMPERVITE is Another Leader


IMPERVITE
is Guaranteed to Waterproof Walls: Cellars & Pits.
A facing of IMPERVITE MORTAR on the inside will resist water on the outside.

Impervite also prevents the cracking of STUCCO.

Send for Booklet 83, "Stucco and Waterproofing."

The Standard Paint Company

The Standard for Two Generations. **New York Boston Chicago**

scriptions of chemicals used in the art of dyeing are included in 48 pages, and leaves nothing to be desired in the way of accurate data for the information of the working dyer.

This little volume, the size of which is convenient for the pocket, is bound in a very durable waterproof cover, and is a very great improvement over the well-known first edition of this little work. A copy of this volume may possiby be obtained from the CASSELLA COLOR COMPANY by addressing a request to any of its branches.

FACTORY FURNITURE.

When an operative gets tired, production decreases. It is purely a matter of economy and efficiency, therefore, to provide operatives who can use such articles, with suitable places to sit and rest when the opportunity affords. For this purpose the "Kalamazoo" steel stool and chair have proven their merits by the test of time. The angle steel used in their construction insures perfect working qualities. All joints are riveted, no bolts or screws being used, and consequently they are strong, durable and will not fall to pieces. The seats are of solid hard wood. The three-quarter inch angle steel from which they are constructed is reinforced with an electric welded steel ring which holds the legs in perfect shape and allows an immense amount of rough usage, making them practically indestructible. These excellent features have made "Kalamazoo" steel furniture popular. It is now used in many of the largest manufacturing and retail establishments and by the published reports of the users is giving universal satisfaction. This furniture is sold from factory to user, Catalog No. 15 will furnish illustrated descriptions of the various types and may be secured by addressing the KALAMAZOO STEEL GOODS CO., Kalamazoo, Mich.

The new firm of Cronkhite, Pope & Co. has been formed to act as sole New England agents for the Douglas Company, Cedar Rapids, Iowa, largest independent producer of starch and gluten feed, with a $2,000,000 plant recently enlarged and equipped with modern machinery.

The new firm is composed of Leonard W. Cronkhite, of Cambridge, and J. William Pope, formerly vice-president of the Charles Pope Glucose Company and manager of their St. Louis plant, who bears a name known to most mill men of twelve years ago. Mr. Pope, with many years of experience as a starch manufacturer, now enters the distributing end of the business with the strongest independent organization in the industry.

Mr. Cronkhite will retain the business of The Leonard W. Cronkhite Company, industrial chemicals, successor to the old Boston importing house, remembered by many mill men, of Balch, Bailey & Co., and textile agent for the Procter & Gamble Distributing Company. Mr. Cronkhite also will remain treasurer of The Industrial Starch Company, of Boston. Mr. Cronkhite has made a special study of the physiology of starches and their applications to the textile and paper industries. He received his training at the Massachusetts Institute of Technology, Brown University and the University of Oxford, entering the textile supply business in 1908. The firm has offices at 53 State street, Boston.

OILLESS BEARINGS AND SADDLES.

The past six months has seen some really revolutionary changes in the manufacture of a graphite impregnated wood bearing. The use of wood for bearings is a rather old proposition, but the use of oilless bearings made of wood is an invention of the past few years. However, this method of impregnating wood bearings with graphite is entirely new and was, it is claimed, first successfully developed by the GRAPHITE LUBRICATING CO., at Bound Brook, N. J. Their "Nigrum" bushings and saddles are well known to the cotton mill trade of the South, but they have further developed these until now they have an adjustable oilless saddle which is giving excellent satisfaction in a number of mills where it is being tried out. "Nigrum" treated wood is also giving satisfaction in a number of cases as skewers and arbors, in addition to the general use as bearings and bushings. Any further information desired in connection with these useful products may be secured by addressing the company at Bound Brook, N. J.

News reaches this office from authoritative sources that the Westinghouse strike at East Pittsburg has been called off by the workmen. This was done on Thursday, July 9th. While the day set for returning to work was Monday, July 13th, a large number of men reported on the Friday and Saturday preceding. The works are now reported to be running full time.

A. F. Voigt, the vice-president of THE ARABOL MFG CO., New York City, returned on the steamer Imperator from an extended trip to Europe on July 15th. C. Seitz, the secretary and treasurer of the company, who has likewise been on the other side for some time, is expected back about August 1st.

An interesting booklet has recently been received entitled "Another Mile." This booklet is issued by the BARRETT MFG. CO., of New York, and contains a photograph of the vast plant of the Standard Steel Car Works, which carries another mile of Barrett Specification Roof. They had to photograph half the town to show the roofs of the plant, but it's worth looking at, and can be secured on request.

The Duluth office of the H. W. Johns-Manville Co. has moved to larger quarters at No. 327 W. First street, in order to take care of its increased business. The new office is on the ground floor, with windows for the display of J-M asbestos roofing, pipe coverings, packings, sanitary specialties, auto accessories and other products of this company's well-known and varied lines.

TURNER, TUCKER & CO., INC., Boston, Mass., have issued a July circular of a number of securities, the information about which was obtained from reliable sources, and is well worth the perusal of anyone contemplating investments. This company is prepared to render special service to any investor who is dissatisfied with his present holdings and desires to secure something better suited to his purpose.

Inquiries about anything pertaining to the textile industries will be cheerfully answered by COTTON.

GLENLYON DYE WORKS

(Yarn Dept.)

CENTRAL FALLS, R. I.

FRANK A. SAYLES, Lessee

Bleachers and Dyers

OF

Cotton Yarns in Ball-warps and Skeins, Silk and Viscose Silk

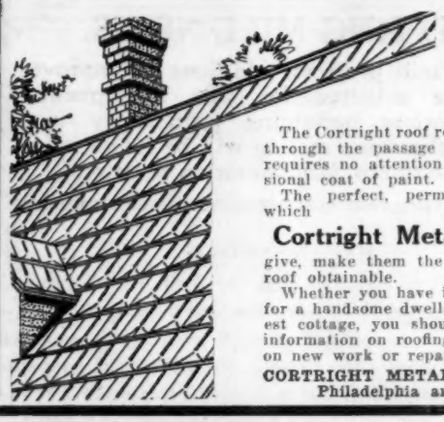
SPECIALTIES: COLORS FAST TO BLEACHING, Mercerizing, Laundering, Cross Dyeing and Light. Dyed Novelty Effects in Fast Colors. High Grade Bleaching of Cotton Warps and Skeins. Silk Dyed Fast to Boiling Off and Bleaching.

Insist on Having

"GLENLYON DYED YARNS"

Safest and Most Reliable in the Market.

Write for Shade Card, Information and Guarantee.



The Permanent Roof

The Cortright roof remains unchanged through the passage of the years and requires no attention beyond an occasional coat of paint.

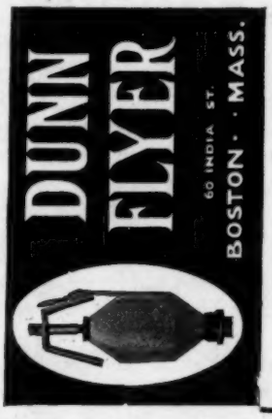
The perfect, permanent protection which

Cortright Metal Shingles

give, make them the most economical roof obtainable.

Whether you have in mind a roofing for a handsome dwelling or for a modest cottage, you should write for our information on roofing before deciding on new work or repairs.

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago



PERFECT BALANCE.
NO CHANGING SLOT.
TWIST RETAINED.
A " DOG DAY" FLYER

MORE AND BETTER ROVING

LESS DOFFING, HANDLING, SETTING IN, PIECINGS AND WASTE.

Costs No More
Makes and Saves You Money.

DUNN FLYER CO.
60 India St., Boston, Mass.

The "1912" Cloth Cutting, Folding and Winding Machine

This machine will cut down operating expenses. It does in one operation the work which is now being done in two. It cuts the cloth, folds the edges and rolls them up in one operation, and at all times gets one more strip out of a bolt of cloth than is possible with the old method of cutting. At the same time it measures the bolt of cloth to show the manufacturer whether or not he is getting the number of yards he is paying for. With the high price of cotton to-day every knit goods manufacturer ought to look into this to see if he is getting the maximum efficiency at the least expense. You will find when you come to figure it up in the course of a year that the labor it saves is a big item.

Also have other labor-saving devices, and upon application you can get prices and full information on same.

J. A. FIRSCHING, 50 John St., Utica, N.Y., U.S.A.

Clinton H. Scovell & Company

Certified Public Accountants
Industrial Engineers

110 State St. CHS&C CERTIFIED PUBLIC ACCOUNTANTS MASS AND Boston, Mass.

Textile Cost Accounting

WATER SOFTENING OR FILTRATION

FOR BOILER FEED AND ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

DIXIE SPINDLE & FLYER O., Inc.

Expert Overhaulers and Repairers

COTTON MILL MACHINERY

CHARLOTTE, N. C.

FOR

SCOURING—WASHING

There is nothing which gives you the soft, harmless, thorough and low-priced results of

Alumina Soapalite

THE MINERAL SOAP

The Electric Smelting & Aluminum Co.
LOCKPORT, N. Y. Sole Manufacturers

KNITTING MILL NEWS.

Notices of mill projects, additions or improvements are solicited for this department. Other notices pertaining particularly to the Southeastern section will be found in the Southern Mill Situation review.

MASSACHUSETTS.

MALDEN. It is reported that the Yale Knitting Company, who manufacture union suits and sweater coats, has purchased from the city a plat of ground, about 6,000 square feet, adjoining the present plant, and has prepared plans for the construction of a four-story addition. It has not been as yet decided when enlargement will be made, and contracts have not as yet been awarded.

ROCKLAND. The Rockland Webbing Company have added to their plant by the purchase of a shoe factory which was located opposite to them. This building they will either remove entirely to allow for an adequate building to take its place, or extensive improvements will be made to fit it up for equipment suitable to their work.

NEW YORK.

COHOES. The Cohoes Mills will observe the first week in August as vacation week, and all the employees will be allowed to take their annual rest. The mills usually make repairs during the layoff.

COHOES. It is reported that I. Roff & Son, owners of three mills at this place—viz: the Atlantic, the Lincoln and the Roff Underwear Mills—will sell their interests in these mills. This company recently transferred the Green Island plant to this city, and the mill has been operating in full and with an increased capacity.

ILION. The Sterling Mills, Inc., which have been shut down for several months, have once more started operation.

POUGHKEEPSIE. The Ideal Linen-Mesh Company, manufacturers of linen-mesh underwear, have removed to 373 Mill street, in the same city. It is reported that the number of operatives is to be increased and the plant somewhat enlarged.

UTICA. The hosiery department of C. H. Yates & Co., manufacturers of sweaters and hosiery, will be shut down for one month, beginning July 15th. The sweater department will continue operation as usual. This is the annual shut-down for general cleaning up and repairs.

PENNSYLVANIA.

PHILADELPHIA. The Andrew Burton Company have recently incorporated to conduct a dyeing business in cotton and woolen goods and hosiery. This company has a capital of $20,000.

TERRE HILL. T. L. Seidel, general manager of the Terre Hill Hosiery Company, confirms the report that this company has taken over the plant of the Colonial Hosiery Mills. It is expected to double the capacity of the plant, and the new company is now understood to be in the market for additional machinery.

RHODE ISLAND.

CENTRAL FALLS. The carding department of the Blackstone Stocking Company is being operated on a day and night schedule, and it is the present intention of the company to continue to do so indefinitely.

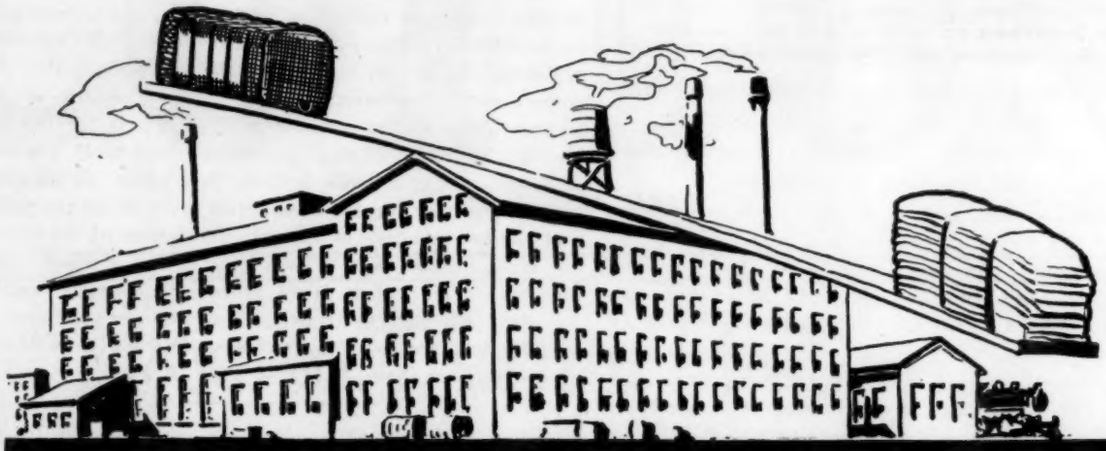
Our MODEL F machine not only makes half hose automatically, dropping them from the machine and effecting a saving of from 7 to 15c per dozen, but will also make women's stockings with a knitted turned welt, saving time, waste and, consequently, money.

Established 1865

Scott & Williams, Inc.,

88 Pearl Street
BOSTON

NEW YORK PHILADELPHIA UTICA



When Cotton is up and Goods are down your balance sheet emphasizes the importance of stopping the leaks in your cost of production.

Clinchfield Coal

AND

Clinchfield Service

First aids to the boiler room, have helped many a manufacturer in a pinch.

Mined By

CLINCHFIELD COAL CORPORATION
DANTE, VIRGINIA

Sold By

CLINCHFIELD FUEL COMPANY
SPARTANBURG, S. C.

CLEAN

LUMPY

"NEVER SHORT OF CARS"

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

Davison's Textile Blue Book for 1914-1915. 1,072 pages. Price, office edition, $4.00; pocket edition, $3.00; salesmen's directory, $3.00. Published by the Davison Publishing Company, 407 Broadway, New York City.

The twenty-seventh annual edition of this well-known publication has just been received and contains a list of 2,231 cotton mills, 1,256 woolen mills, 1,087 silk mills, 1,667 knitting mills, and other mills, dye works, bleacheries, etc., to a total of 7,274 mills. Besides the regular reports, a separate list of new mills is shown, as well as textile maps showing all towns where there are textile plants of any character. This "Blue Book" is really twenty-nine directories in one volume, and the office edition is issued with thumb indexes for quick reference. The salesmen's directory is bound in flexible leather, size 3½ x 5¾ x ½ inches.

Henley's Twentieth Century Book of Receipts, Formulas, and Processes. New and revised edition. Edited by Gardner D. Hiscox, M. E. 800 pages. Price, cloth binding, $3.00; half morocco binding, $4.00. Published by the Norman W. Henley Publishing Company, New York City.

This work contains over 10,000 practical receipts and formulas for every-day use in business, at home, or at the factory. It is arranged alphabetically and covers nearly everything from antiseptics to waterproofing, including lubricants, rust preventives, dyes, filters, disinfectants, etc.

Southern Cotton and Knitting Mill Directory for 1914. 226 pages. Bound in heavy paper. Price $1.00. Published by the Textile Manufacturer, Charlotte, N. C.

This directory contains an authentic list of all the cotton and knitting mills in the 16 southern states. It also furnishes the amount of capital stock, spindles, looms, knitting machines, loopers, sewing machines, and other machinery, utilized in the special mill under discussion, as well as furnishing information as to how the mill is driven, who its officers are, and who does the buying. It is of convenient size for the pocket, and will prove a convenient and useful companion for many a traveling man or mill man who is desirous of having this information in a handy, compact form.

How to Build Up Furnace Efficiency. By Joseph W. Hays. Seventh edition. 126 pages. Bound in paper. Price, $1.00. Published by Joseph W. Hays, Rogers Park, Chicago, Ill.

The evident intention of this author is to present plain facts on fuel economy and furnace efficiency in practical, every-day language that is easily assimilated by the special class of men the author desires to reach. In attaining this result, Mr. Hays has been remarkably successful, and the many striking examples with which he illustrates his text, many of them in the form of stories, will appeal to the man in the power plant as being just what he wants.

Clark's Directory of Southern Cotton Mills. Edition of July 1st, 1914. 152 pages. Bound in cloth, Price, $1.00. Published by the Clark Publishing Company, Charlotte, N. C.

The semi-annual edition of this convenient little pocket directory came out during the past month, and in addition to the information previously contained of mills listed, both alphabetically and by towns, and the maps which this directory always contains, it has in this edition a new departure in the way of a section entitled "Hints for Traveling Men." The publishers state that these hints are not complete as yet, as this is their first effort to compile such information, but the information given shows the name and place of residence of the principal buyers of the southern mills, together with a list of the mills for which these men buy. This will no doubt prove a time-saving feature for many salesmen, particularly those who are not familiar with the southern field and who have to dig out the information as they go along.

Dyehouse Efficiency. By Louis Joseph Matos, Ph. D. 19 pages. Published by the Cassella Color Co., 182 Front street, New York City.

This little book contains extracts from a paper read before the American Institute of Chemical Engineers at Boston in June, 1913, and published in the sixtieth volume of its transactions. They are republished in book form by this company, with the permission of the American Institute of Chemical Engineers for distribution among their many friends in the trade.

The "Protective Tariff Cyclopedia," prepared and published by the American Protective Tariff League, New York, will be ready for distribution on or about August 1st. The Cyclopedia will contain the official text of the Underwood law; the Underwood and Payne-Aldrich laws compared, giving every rate of duty on articles in both laws; what 152 United States Senators and Congressmen said for and against the Underwood bill; and a copious index of over 8,000 citations. The volume will consist of about nine hundred (900) pages, and will answer all questions on the tariff question.

A very interesting catalog which has recently been received is known as Advance Section A of General Catalog No. 110, sent out by the Link Belt Company, Chicago, Ill. This catalog describes the original Ewart detachable link belt and sprocket wheels. It contains information and how to obtain the working strains and horsepower of link belt, together with illustrations showing standard sizes and special sizes. It also shows a variety of attachments which may be applied to this type of link belt for a various number of purposes. Much other interesting material is also contained in this advance catalog to those who are using or have use for link belts. A copy may no doubt be secured on application to any of the branches of the Link Belt Company.

The many southern friends of Mr. Cottrell will be glad to learn of a recent large order he has closed at the Fall River Iron Works Mills, Fall River, Mass., for an equipment of turbo-humidifiers. The number of heads in this equipment is 304, which are to be installed in the weaving departments of these mills.